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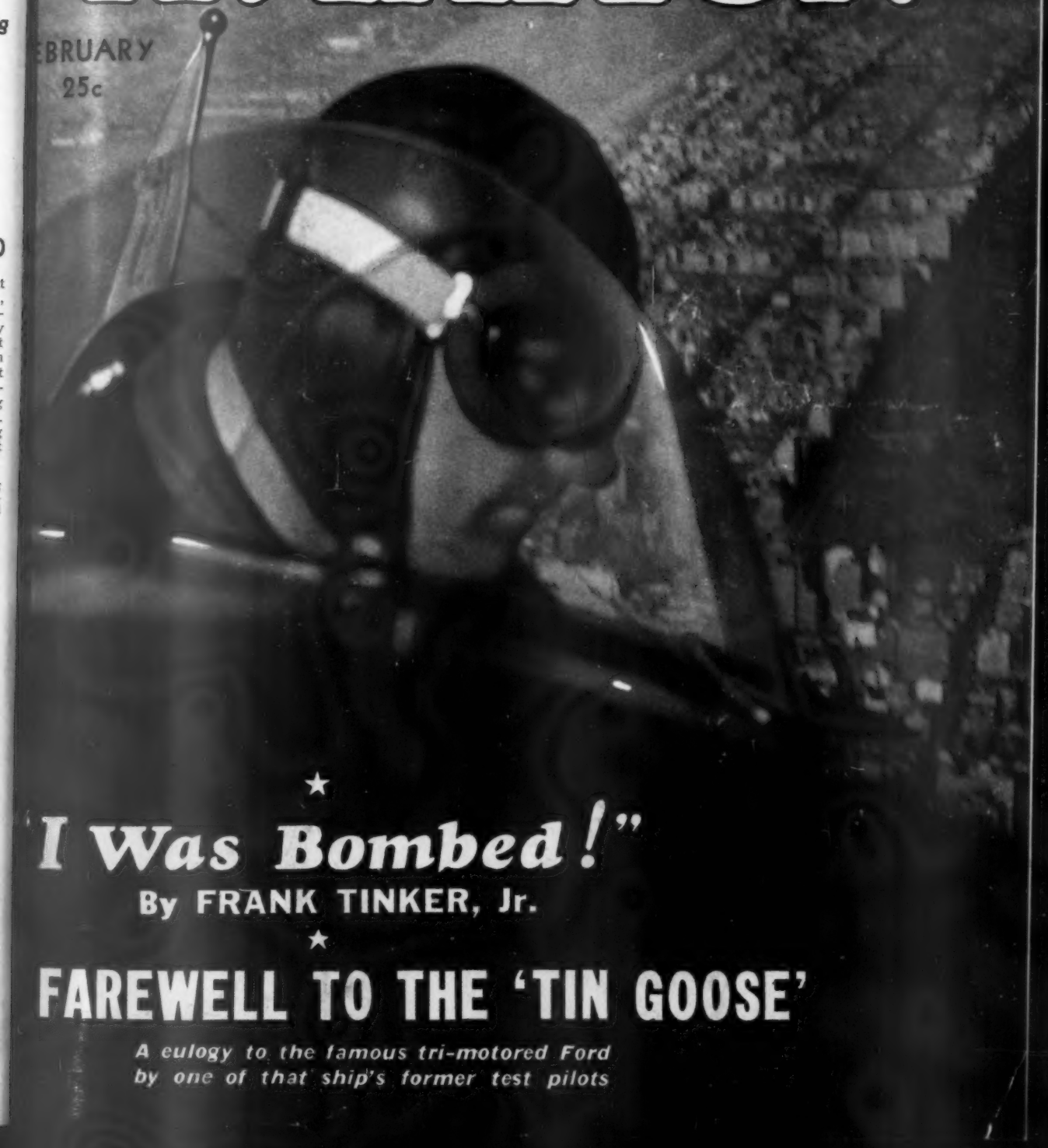

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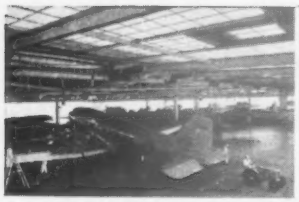

Above: *WAE Los Angeles maintenance shop*

Below: *WAE Douglas flying over Boulder Dam on the National Parks Skyway*

WESTERN AIR EXPRESS

C. N. (Jimmie) James, Western Air Express vice president in charge of operations, discusses the Link Trainer with their Instrument Instructor, William McCormick, a recent California Flyers graduate.

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Says Mr. James, *"We are pleased with the close personal contact that California Flyers can give us in our employment problems and of the high caliber of their graduates."*

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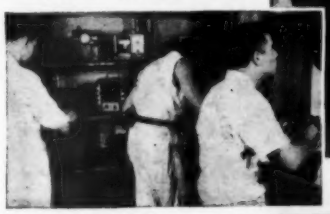

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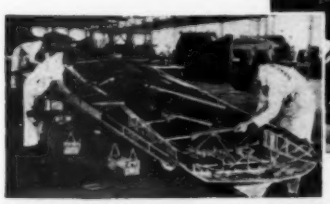

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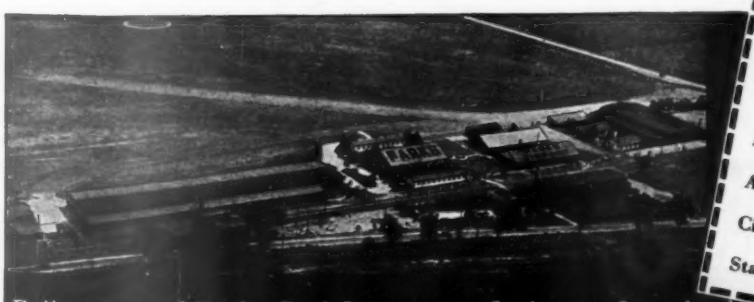

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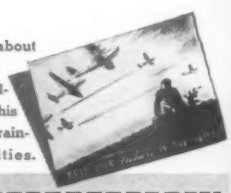

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Above: A section of the drafting room *Below: Minor repairs, line service*

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P. A. FEB. 1939

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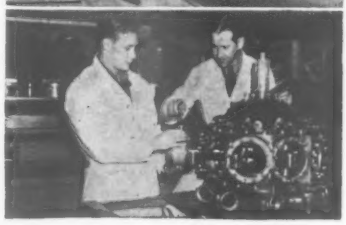

ABOVE: Palm fringed Ryan Administration building . . . Student gets blind flying instruction . . . Mechanics courses feature factory methods and latest type equipment.

The success record of Ryan graduates in every branch of aviation is the true value test of Ryan training. Whether in the fields of *flying, mechanics* or *engineering,* Ryan recommendation means more because it comes from the oldest Government Approved aviation school, with 16 years experience in training men for aviation careers.

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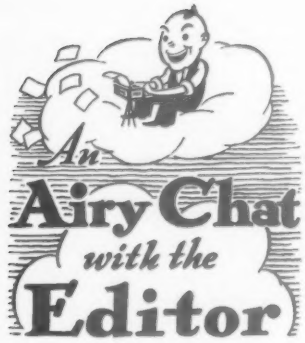

LIGHTPLANE popularity recently received a big boost by virtue of the recent coast-to-coast flight made in what is known to the airport gophers as a "putt-putt".

In a way, this momentous flight in a 50 h.p. monoplane is comparable to the first transatlantic flights. It was one hundred percent educational and really proved an important link in aviation history---the ability to make long flights with flivver economy. This is more than just another transcontinental flight—it really proved of value to the public and we hope that the public absorbed the lesson and cogitated upon the matter.

Details of this affair will be found back in the pages of this issue where the story of the astounding feat will make an impression upon all aviation fans. When it comes to fuel economy, this little plane has even the motorcycle backed off the boards and has the cost of navigation reduced to almost an irreducible minimum.

* * *

WHILE the widely publicized plastic construction mania may seem a recent development to late comers in aviation, the use of plastics for airplane construction is really very old. It is only natural that the idea of "reinforced concrete construction" principles should make an appeal to the engineers of long ago because this scheme checks up with structural progress in building construction.

'Way back before the war, Louis Bleriot started the ball rolling by employing papier-maché as a plastic material which was reinforced by silk threads and rattan rods. Thus in 1910-1912, the use of plastic imbedded rods was not only suggested but put into practice by the great French engineer, an innovation that was quickly followed by the firm of Deperdussin with their reinforced tulip wood monocoque planes. These Deperdussin planes, by the way, were the winners of the 1912 Gordon-Bennett Trophy races witnessed by the writer.

(*Concluded on page* 89)

POPULAR AVIATION

Volume XXIV FEBRUARY, 1939 Number 2

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Robert P. Terrazas of
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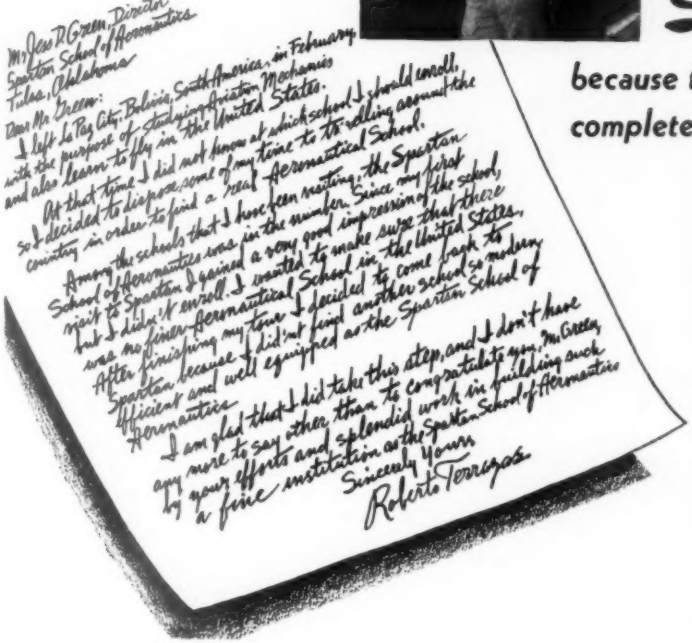


December 10, 1938

Mr. Jess P. Green, Director
Spartan School of Aeronautics
Tulsa, Oklahoma

Dear Mr. Green:

I left La Paz City, Bolivia, South America, in February with the purpose of studying Aviation Mechanics and also learn to fly in the United States.

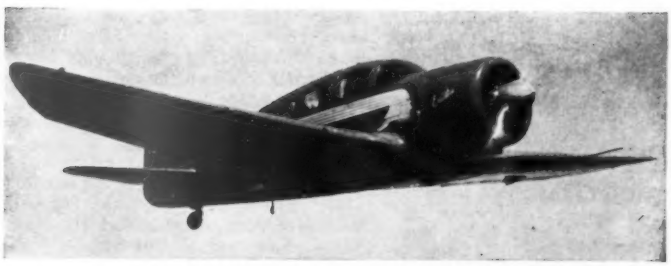
At that time I did not know at which school I should enroll, so I decided to dispose some of my time to travelling around the country in order to find a real Aeronautical School.

Among the schools that I have been visiting, the Spartan School of Aeronautics was in the number. Since my first visit to Spartan I gained a very good impression of the school, but I didn't enroll. I wanted to make sure that there was no finer Aeronautical School in the United States. After finishing my time I decided to come back to Spartan because I did not find another school so modern, efficient and well equipped as the Spartan School of Aeronautics.

I am glad that I did take this step, and I don't have any more to say other than to congratulate you, Mr. Green, by your efforts and splendid work in building such a fine institution as the Spartan School of Aeronautics.

Sincerely Yours
Roberto Terrazas

After seven months spent in visiting the leading Schools of Aviation in the United States Roberto P. Terrazas is today a member of the SPARTAN DAWN PATROL, because he found SPARTAN the Nation's most COMPLETE School of Aviation. The reason for Roberto's choice is the reason for SPARTAN'S International Leadership in Aviation. Located at Tulsa, "Oil Capitol of the World", Spartan is in the center of an Industry, the leading user of AVIATION EVERY DAY—THE YEAR ROUND. In the Southwest, ideal flat flying country "nature's landing field", the days are clear with bright sunshine the year round without flying hazards of ocean fog or city haze and smoke. At Spartan YOU are in the hub of oil, an Industry reaching to the four corners of the World.



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I FLEW COAST T

The author is shown below (left) checking the weather with an American Airlines pilot and meteorologist. These men radioed weather information to Jones up until the time his radio became unworkable. At left he is fuelling his ship before the take-off.

by JOHNNY JONES

Exclusive! Here is the story of an amazingly commonplace transcontinental flight by the man who made it.

THE idea for a non-stop coast-to-coast flight with a lightplane was Carl Wootten's. Carl (vice-president of the Aeronautical Corporation of America) and myself have for years been confronted with the difficulty of convincing the average pilot that the lightplane really is capable of doing almost any kind of flying there is. Usually pilots snort at the tiny 50 h.p. ships and, usually, the mention of a long cross-country flight with one of them will shock Mr. Airman no end. Personally, I've been flying these little "backyard flyers" (some skeptics concocted that name) for about nine years. I've never hesitated to do any sane kind of flying with these ships. So, when Carl described his idea for a "proof" flight that would definitely establish the lightplane as a cross-country ship, I got my bid in for the flight as fast as I could utter the words.

Well, today I've got plenty of ammunition to shoot at those die-hards. My flight from Los Angeles to New York was made non-stop in 30 hours and 47 minutes. Average speed for the 2,785 miles I flew was about 91 m.p.h. Considering the fact that my ship was just a standard Aeronca like those you see at the average airport, that speed is excellent. When I say standard I mean just that. The engine was a stock 50 h.p. Continental. The ship itself went down the Aeronca company's production along with several others. But, because we wanted to try the flight non-stop, extra gas tanks were installed. These facts are unusual enough in themselves, but the most startling thing about the whole flight is the actual operating cost—$25.70! For comparison's sake, a one-way ticket on a bus between Los Angeles and New York costs $41.85—and it takes a minimum of 88 hours.

These men were responsible for Jones' unusual flight. Left to right are Carl Wootten, the author, Carl Friedlander.

Frankly, when I look back on those figures they sort of take my breath away. Imagine flying from one side of the United States to the other for a mere $25.70! Breaking the cost down, though, you can readily see that such economy actually exists in aviation today. I only burned 125 of my 146 gallons of gasoline on the flight and had enough left for about six hours of flying after I landed in New York. The engine only burned *two quarts* of oil on the entire trip. Figuring my gas consumption, I got 22.3 miles per gallon. So, inasmuch as my cruising speed for the entire trip was 90.6 m.p.h., that means that the Continental engine burned just 4.2 gallons per hour. On that basis, then, my entire flight cost 9/10 of a cent per mile—which is a far better price than an automobile, bus or train will give you.

From an aeronautical standpoint, I'd say the airplane itself was the most astonishing thing about the whole flight. The standard Aeronca like that I flew weighs 665 lbs. empty. My ship, with its extra tanks and miscellaneous equipment, weighed 854 lbs. empty. Gross weight of the standard Aeronca (that includes all the gas, oil, pilot, passenger and baggage) is 1,130 lbs. My ship, fully loaded, weighed 1,925 lbs. Off-hand, one would think that, with such a tremendous overload for so small an airplane, it would be almost impossible to get her off the ground. But even I was surprised when, on my take-off from Los Angeles, the ship was in the air and climbing within 1,500 feet! Remember, my ship got off the airport in that length carrying more than *three times* its own weight—and on a 50 h.p. engine!

TO COAST FOR $25.70

STATISTICS

Miles	2,785
Time	30 hrs. 47 min.
Miles per gallon	22.3
Cost per mile	$0.009
Cruising Speed	90.6 m.p.h.

So much for the opening statistics. The actual flight itself had many interesting aspects to it, although my 30-hour ride was comparatively monotonous and routine. All things considered, the weather was excellent all the way across. But that's getting the landing before the take-off, so I'll back-track a bit. As I've pointed out before, Carl Wootten thought up the flight. He had proposed it to the lightplane manufacturer with whom he'd been associated before joining the Aeronca company. They were just lukewarm to the idea, despite the fact that they were fighting the same prejudices against lightplanes that every other small-ship manufacturer was. My first impression of the idea as broached to me was that it was just a publicity stunt for the manufacturer. But, on thinking it over, I soon was convinced that such a flight would really put the lightplane on the map as well as help all the lightplane manufacturers in getting over their "jinx". The more I thought of it, the more enthusiastic I became. When Mr. Friedlander, president of the Aeronca company, officially okayed the flight I couldn't wait to get my ship off the factory's production line and get going. I flew out to Cincinnati as soon as I learned that the ship was being built up. Finally, the finished airplane was rolled out on Lunken airport and I took her up for her first test flights.

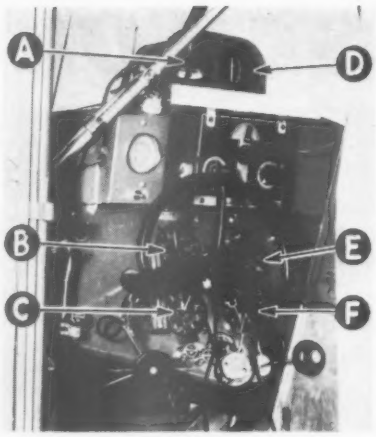
With initial tests completed, I took the ship to Detroit, where Carl Bachle, chief research engineer for Continental engines, helped me run tests on the engine's fuel consumption. We got that down from its original 6.2 to 3.6 gallons per hour. Those tests ran from November 12 to 19. When they were completed, I flew the ship from Detroit back to my home field at Los Angeles. Incidentally, if I'd had a National Aeronautic Association barograph in the ship on that ferry flight I'd have broken the world airline distance record for lightplanes. One leg of my flight to California—from Cincinnati to Fort Worth, Texas—I made non-stop in 12 hours and 13 minutes. The distance is 901 miles; the lightplane record in my ship's category is 564.88 and was made in France. The rest of that ferry flight was uneventful.

Once back at my home field, we set to work getting the ship ready for the big flight. By "getting ready", I mean we installed a new Kollsman turn-and-bank indicator, a compass and radio. We had a wind-driven generator to operate the radio and lights. That generator turned out to be the only really unsuccessful piece of equipment on the whole flight. It had burned out on the ferrying flight to California and subsequently burned itself out two more times.

The ferrying trip ended in California on November 25. The four days between that date and the time I left for New York were occupied in installing instruments, having pre-flight photographs made and waiting for an extremely high east wind to die down. On the 26th, airline weather men informed me that, if I took off right away, I'd have a fairly strong tail wind all the way. That east wind still was blowing on the ground, though. Nevertheless, I took them at their word and we rushed ahead with plans for the take-off. An observer of the National Aeronautics Association had ripped a hole through my ship's fuselage fabric and installed the barograph which would make the flight official. Part of our time was spent in patching the large hole that had

Flight's end. This is the author's arrival and reception in New York.

Jones' seat is in foreground with parachute harness. Fuel tanks are beside it.



A, turn-bank; B, airspeed; C, altimeter; D, compass; E, oil gauge; F, tachometer.

to be torn in the bottom of the fuselage for the purpose. As I say, we hurried ahead that afternoon and evening, hoping to get the ship ready in time for me to take-off and use the tail wind the weather men promised me. Then, when I checked the weather again at 11 p. m., I discovered that that tail wind was at 12,000 feet. That ended that start right there, for I couldn't possibly plan on climbing the ship higher than 6,000 feet with that tremendous load aboard.

So, at a little after 11 p. m., I flew the ship from Grand Central Air Terminal over to Mines Field for the night. I planned to use Mines' long runway for my take-off. Incidentally, in flying from Grand Central to Mines, I flew over that tremendous forest fire we had there. When I landed I found many cinders on the ship's fuselage and wing.

As soon as I landed at Mines Field, we loaded the ship's tanks with fuel so as to facilitate an early departure. By the time we finished all these little items it was 2:30 a. m., so I slept at the airport that night.

While I'm on the subject of sleeping, I understand some people have said that I "practiced staying awake" especially for this flight. Well, that's a silly statement, it seems to me. So far as I'm concerned the best practice for staying awake is sleeping. Actually, I had no excess sleep before the flight. At no time did I sleep more than eight hours at a stretch.

Next morning the fellows at the airport woke me quite early. But, in checking with the airline weather men again, I found that that queer east wind still was blowing hard, particularly through Guadalupe Pass, which was the one spot on my transcontinental course that worried me—largely because of its altitude compared to the ceiling of my heavily loaded airplane. They told me the wind through the Pass was blowing 44 m.p.h., something unheard of in the past.

Consequently, I had to postpone my take-off again. So, at 6:30 that morning, I went to bed. My mother woke me up at 9 a. m. She had just gotten a local newspaper with my picture and a story about my impending flight. It was the first she had known about it, for I'd not told her my plans for fear she'd worry—like all mothers do, whether there's reason to or not. But she just grinned at me when I told her.

That was the 26th, and that freak wind still blew on and on. Next day I went back to my regular work at Los Angeles Metropolitan airport. I kept checking the weather three times daily. On the night of the 28th came the report I'd been waiting for. The wind through the Pass had died down from 44 to 10 m.p.h. Reports all along the route that kept coming in told me I'd have no more than a 10 m.p.h. head wind from Los Angeles to El Paso and that from Fort Worth to New York I'd actually have a tail wind.

At 6:30 a. m., Pacific Standard Time, on November 29 I took off down Mines Field's 3,000 foot runway. There was an overcast sky above the airport, so I circled and climbed—staying over the airport all the time—until I had climbed through the overcast into the clear. In 40 minutes I had reached 3,300 feet. I then set a compass course for the San Gorgonio Pass, using the mountains as landmarks. Meanwhile, the visibility had cleared and I could see the ground. At about 7 a.m. I flew over the Army's big air base—March Field—and saw squadrons of big bombers warming up for morning maneuvers.

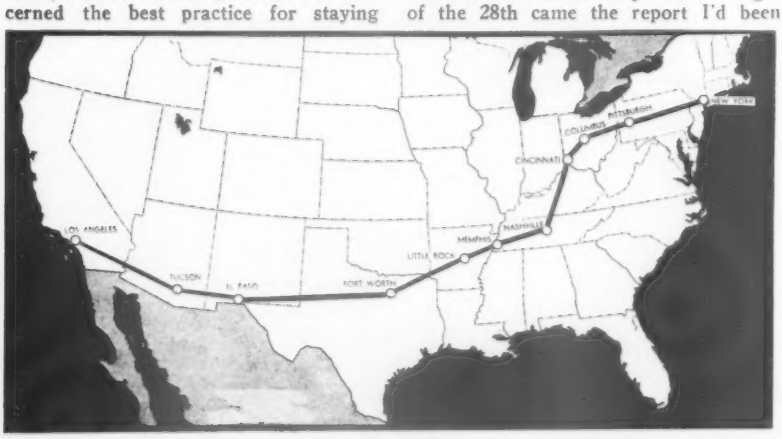
My greatest worry now was the usually turbulent air in the Pass. I didn't know just how my heavily loaded ship would take it. It wasn't long, though, before I had reached that avenue through the San Bernardino mountains. When I entered the Pass I was flying at 3,300 feet. The ship settled to 3,000 feet almost immediately—but that's all that happened; the air was comparatively smooth. Then I let her settle to 1,500 feet as we passed over Salton Sea. By that time I had become fairly accustomed to my comparatively small quarters and had settled myself for the long trip ahead. The big auxiliary gas tank beside me (where the passenger ordinarily would ride) cut off my view to the right, but I still had excellent visibility forward and to both sides.

From Salton Sea I set a compass course for Yuma, Arizona, 125 miles ahead. At Yuma I began a gradual climb to 4,000 ft. to get over the mountains. I made it without any difficulty. At that time, the ship's weight was lightening at the rate of 30 lbs. per hour due to fuel consumption. Later the rate dropped to 24 lbs. per hour and, at the flight's end, had dropped to 20 lbs. per hour.

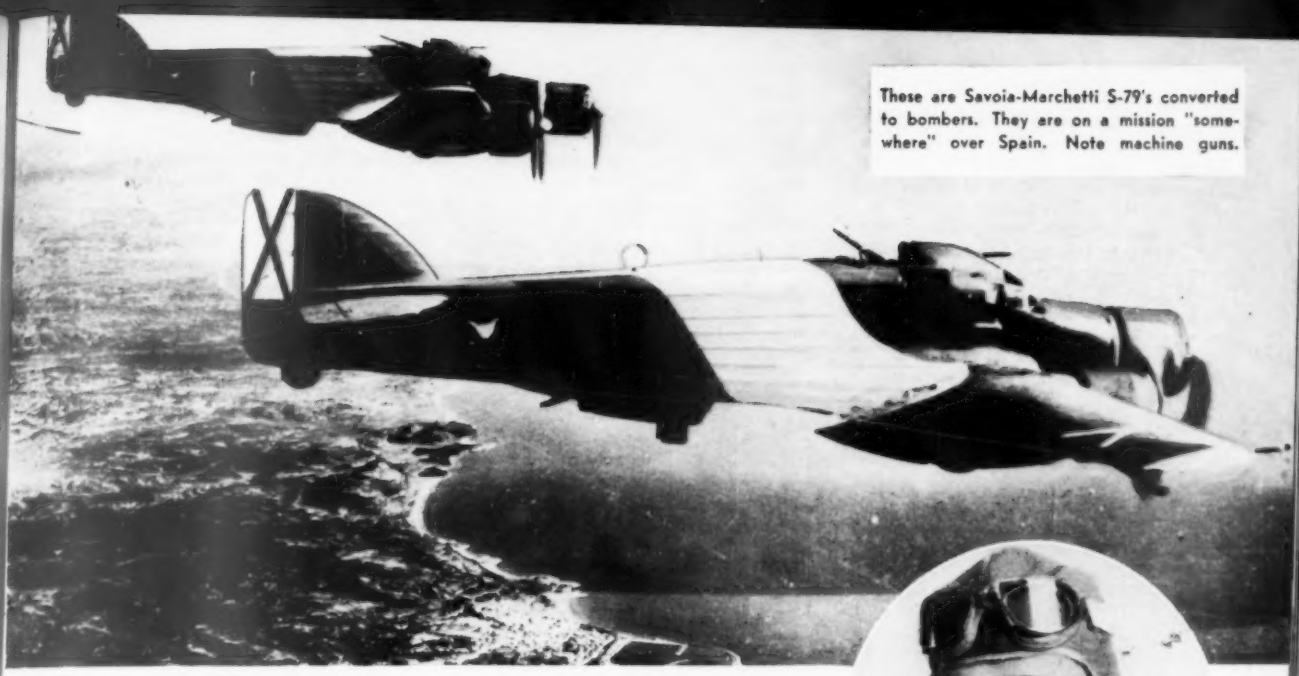
En route to Tucson from Yuma I ate the first candy bar. My "food supply", incidentally, consisted of candy bars, dates, water, milk and bread. I had only had a cup of coffee for breakfast before leaving Los Angeles. Tucson, then, was my first definite check point from which information was passed on to the Aeronca factory. I passed over Tucson's airport at 800 ft. at 3:14 p.m., Eastern Standard Time, 465 miles out of Los Angeles. I figured my average speed from L.A. to Tucson was 81.1 m.p.h.

Again I had to climb to get over mountains. This time I went to 6,200 feet to get through a pass in the White Mountains to Rodeo, New Mexico. Then, I followed the international border to El Paso. I had to stay at 6,000 feet all the way, because the ground is about 5,000 feet above sea level all the way. At 6:30 p. m. E.S.T., I passed over the El Paso airport at 1,200 feet. During all this time I had been getting my weather and winds aloft over the radio, which con-

(*Continued on page* 68)



Above is the route Jones flew from Los Angeles to New York. Cities shown are the principal check points. Jones' route largely followed that flown by American Airlines.



These are Savoia-Marchetti S-79's converted to bombers. They are on a mission "somewhere" over Spain. Note machine guns.

'I WAS BOMBED'

By FRANK TINKER, Jr.

The author flew in Spain and took part in many a bombing raid. But suddenly one day he found the tables reversed. Here are his impressions.

Frank Tinker, Jr.

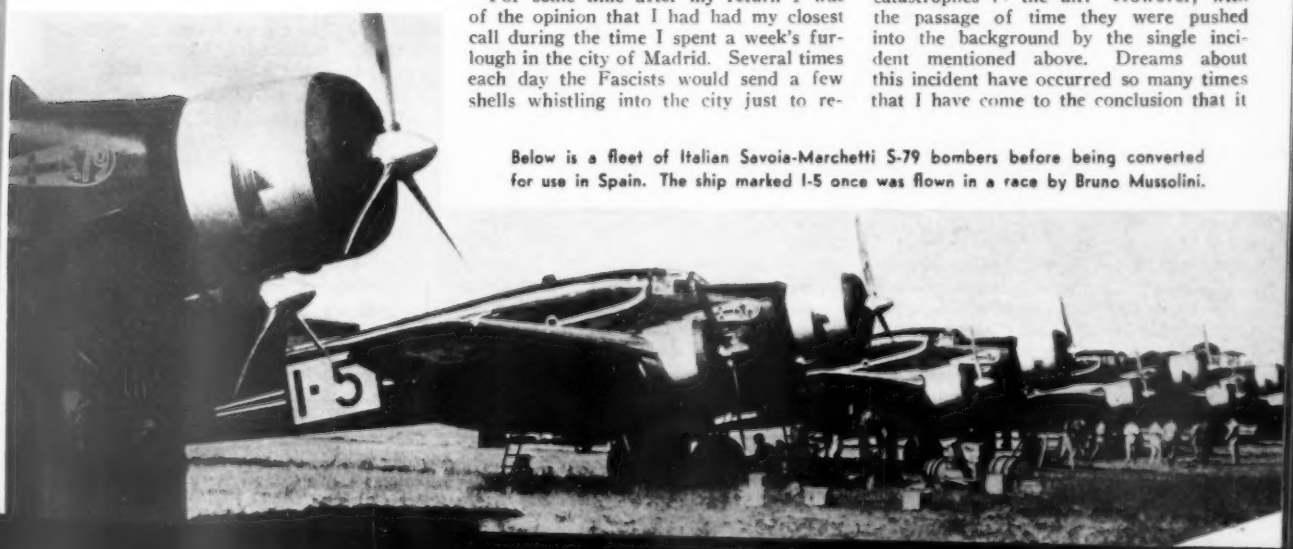
"WHAT was your closest call while you were fighting in Spain?"—That is the question I have been asked more than any other since my return from the Spanish Civil War.

It has been a most difficult question to answer. Over seven months of front-line flying provided so many close shaves that it was almost impossible to determine which was the closest. We returned to our home fields so often with bullet and anti-aircraft holes in our planes that we thought nothing of it. It was just another case of familiarity breeding contempt.

Then there were the night bombardments to consider. Whenever there was an offensive being carried on by either side, our behind-the-lines flying fields could be sure of at least one bombardment per night. Before, during and after the Italian offensive on the Guadalajara Front we were bombed every night for over three weeks. We usually had plenty of advance notice, though, so we didn't consider them as being very dangerous.

For some time after my return I was of the opinion that I had had my closest call during the time I spent a week's furlough in the city of Madrid. Several times each day the Fascists would send a few shells whistling into the city just to remind the Madrileños that there was a war going on. The only warning of one of those shellings was the whistle of the first shell coming over. I had been caught out in the open streets by one of those shellings and had been able to do nothing except stand there until it was all over. Shells had struck buildings on three sides of my position so I had considered that as a rather narrow escape.

Since returning to this country, though, one incident has cropped up in my mind more persistently than any other. When I first returned I used to have dreams and nightmares about dogfights, anti-aircraft bursts, flamers, and other assorted catastrophes in the air. However, with the passage of time they were pushed into the background by the single incident mentioned above. Dreams about this incident have occurred so many times that I have come to the conclusion that it



Below is a fleet of Italian Savoia-Marchetti S-79 bombers before being converted for use in Spain. The ship marked 1-5 once was flown in a race by Bruno Mussolini.

must have been the closest call I had. At any rate, my sub-conscious mind must think so, because the events of the entire morning are as clear today as they were the day they occurred.

My squadron had been working very hard for about two weeks over the Madrid Front. We were using a little field near the village of Campo Real; about 20 miles east of Madrid. The time was mid-summer and there were about 16 hours of daylight; during which we had to be on the field ready for any emergency which might come up. It was also the middle of the dry season so that—aside from the intense heat—the prevailing wind from the westward kept our planes covered with dust and sand. This necessitated frequent overhaulings for the purpose of cleaning the dust out of our motors, machine guns, and retracting gear.

July 22nd happened to be my squadron's day for a clean-up. The mechanics took charge of the planes and we pilots were all given permission to go to Madrid or to any other place in the Henares Valley we might care to visit. As I hadn't received any mail for some time I decided to go over to the main air field at Alcalá de Henares—where my mail was usually delivered. The remainder of the pilots, who were all Russians, wanted to go directly to Madrid. They got their mail through their own Russian commissar but I, being the only American, had to more or less fend for myself as far as mail was concerned.

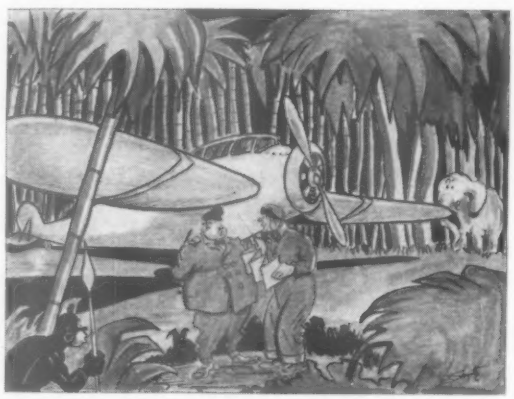
The Russians got to the cars first so that when I arrived at the garage there was nothing left except a huge antiquated American sedan. However, I routed out its Spanish chauffeur — Gerardo — and we spent over an hour driving the twenty-odd miles to Alcalá. Just after we arrived at the field the bombardment alarm, a siren, sounded off so Gerardo and I fled down into the bomb shelter with the ground staff while the squadron of fighters on duty took off to investigate We heard that enemy bombers had been seen crossing the lines at an extremely high altitude—headed in our direction.

After staying down in the shelter for about an hour I decided that the alarm was false. So I dragged the reluctant Gerardo out to the car and we set out for Madrid. We had driven only about a hundred yards, when we heard our anti-aircraft guns open fire. Then we heard the shrill ululating whistle of heavy bombs on their way down. Gerardo had the car stopped and was streaking for the nearest bomb shelter before I could even get my scattered wits together. By the time I got out of the car the first of the bombs exploded about 200 yards away and I knew that it was too late to start for the bomb shelter. I could see A.A. shell bursts directly above, but there wasn't a sign of the enemy bombers. They were so high that they could not be seen with the naked eye. Those bombs might have been coming from outer space, as far as the eye was concerned.

So there I was—with no protection at all except the shallow gutter which ran down one side of the road. However, that was better than nothing at all so I flattened out in its bottom and hoped for the best. All the while I could hear those hundred-kilogram bombs exploding and—what was even worse—could hear others screaming down. Each one sounded as though it was directly above me. And there was still nothing to be seen of the planes that were dropping them.

The first line of bombs—spaced about a hundred feet apart—passed about 50 yards to the eastward of where I was lying. Just as I was dusting myself off I heard more bombs coming down. The first of them exploded just as I hit the bottom of the gutter again. This second line of bombs passed about 50 yards to the westward of my position; setting fire to a disabled fighting plane and a gasoline tank truck which were about a hundred yards away. I had been almost directly between the two lines of bombs.

I laid there in the gutter for about five minutes after the last bomb exploded—it seemed more like five hours—and then got up on very shaky legs and hunted up Gerardo again. This time it took some little persuasion to get him out of the bomb shelter but when I finally succeeded we really made good time in the direction of Madrid. We were about halfway there before either of us noticed that the top of the car was in shreds. Fragments from one or more of the bombs had slashed it to bits.



"We MUST have strayed off-course, Skipper! This doesn't look at all like Newark . . ."

Anticipation of our arrival in Madrid erased all thoughts of the incident from our minds with amazing rapidity. We arrived in the city just in time for one of the shellings; but merely took refuge in a convenient bar and thought nothing of it.

I suppose that we were both so geared up to wartime conditions that we had unconsciously adopted a more or less fatalistic attitude. I knew that the immediate effects of the bombardment, as far as I was concerned, were almost nil because when I wrote up my record that night I dismissed the affair with one abbreviated sentence: "Went to Al. just in time for bombt."

Those ear-splitting detonations and blood-curdling whistles had left their impressions on my sub-conscious mind, though. But the most terrifying thing was the invisibility of the bombing planes. The effect of seeing bombs coming out of an apparently empty sky was almost supernatural—even though I knew the bombers were up there. It takes very little imagination to see what would happen if gas bombs were substituted for ordinary bombs.

I know now why the people of Madrid are able to stand up under almost daily bombardments and shellings. As long as there are more of them to be expected in the future those of the past are forgotten almost as soon as they are over. However, I shudder to think of what they will go through after the end of the war. For the first few weeks there will be a feeling of relief. Then, their sub-conscious minds will begin to bring up memories of terrifying bombardments which they thought had been long forgotten.

It will probably take years for the effects of the siege of Madrid to leave the minds of its citizens. And the children will be more affected than the grown-ups. I doubt if even the psychologists and psychiatrists can predict the effect it will have on them. There is no doubt, though, that many of them will be afflicted with phobias of various sorts when they grow up.

Americans may well take heed of what is going on in Europe. Our large cities are much more vulnerable to aerial attack than the average large city in Europe. The heavy stone construction of most of the buildings in Madrid has been one reason why it has been so successful in withstanding Franco's attacks. When a bomb strikes one of those buildings it very seldom harms any of the adjacent ones. I have seen many buildings in Madrid with their interiors completely destroyed but with their outer walls still standing. A thousand-pound bomb dropped in one of our American cities, though, would probably destroy everything for blocks around.

This possibility, though, need never become a probability—if Uncle Sam acts now. The United States must rearm in the air, because it is from the air that our shores will be most vulnerable.

Our best course is to build up an Army and Navy so formidable that—in the event we are forced into a war—it will be fought on some other country's soil. However, if we carry a big enough stick, it is very doubtful if we would ever be forced into a war. No country in the world would dare to attack us.

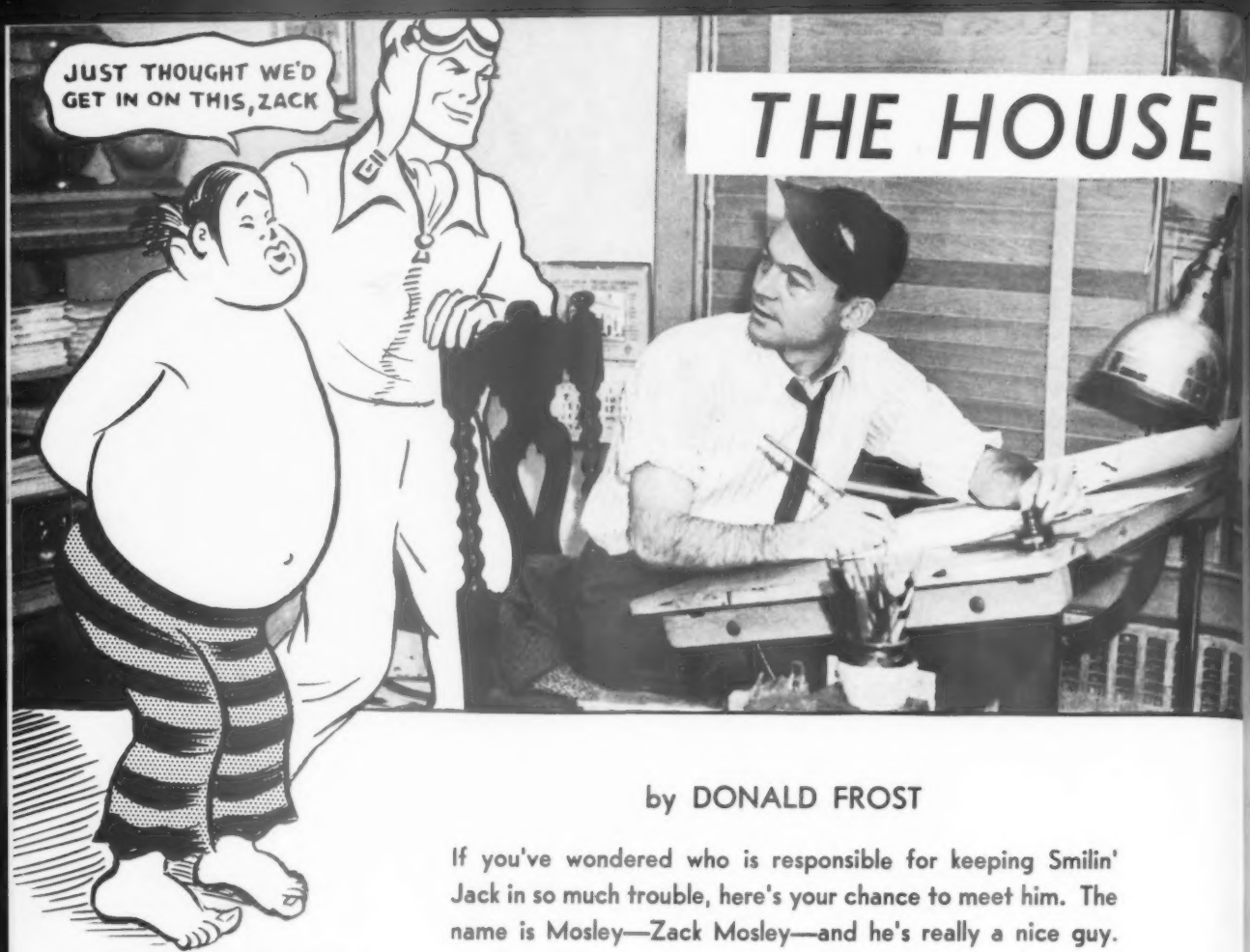
Editor's Note: Next month Mr. Tinker will discuss an extremely important phase of military aviation as he saw it in Spain—the dive bomber.

END

LIGHTPLANE PORTRAIT

This striking shot of a new Luscombe "50" over San Francisco Bay was made by Mike Roberts, prominent aerial photographer.

THE HOUSE



The fellow with the stomach is Fat Stuff. "Our Hero" behind him.

by DONALD FROST

If you've wondered who is responsible for keeping Smilin' Jack in so much trouble, here's your chance to meet him. The name is Mosley—Zack Mosley—and he's really a nice guy.

ON Long Island's exclusive Sands Point stands the House That Smilin' Jack Built.

It's a fine, colonial type dwelling overlooking the transatlantic seaplane base at Port Washington. The owner has a beautiful car and is thinking seriously of buying his own plane.

Smilin' Jack, the daredevil comic strip aviator who flies and fights with impartiality and aplomb, is responsible for all that. And still, the man who—in turn—is responsible for Smilin' Jack schemes night and day to frustrate his hero's search for happiness.

"I've got to keep Jack in jams," he says. "That's what I am, a jam artist."

This jam artist is Zack T. Mosley, born 32 years ago at a wide spot in an Oklahoma road and now such an expert at aviation and devilish plotting that 70 newspapers reproduce his creation for the American public.

Mosley is giving the public what it wants, and Mosley is getting in return what he wants—which, mainly, is flying hours. He never expects to be the flyer his brain child is, but, grinning,

The faithful drawing goes with the Mosleys. The Mosleys never fly off on a trip without Zack's drawing board. He works en route.

THAT SMILIN' JACK BUILT

Zack and Mrs. Mosley (above) love to stay home and do such chores as shovel their walks clear of snow (right). Mrs. Mosley helps Zack with his work, was his model for Gale, the beautiful aviatrix and spy.

he points out with grave concern: "Smilin' Jack has to keep up his flight studies. If he doesn't, I'll get letters telling me about it. Besides that, I'd rather fly a plane than eat."

Zack has held a private license—No. 36224—since he passed his tests on Friday, the 13th of November, 1936. Smilin' Jack already had been pretty terrific for three years as a fearless flyer, but his creator hadn't been.

"Right up until the moment I passed that flying test," says Mosley, "I was scared to death of airplanes. They fascinated me in the same way a snake does a bird. I was making my living drawing a newspaper strip about aviation. But down inside me—well, did you ever have your stomach turn over on a roller coaster?"

It was plain fright. It had been with him for years. The way he conquered it is one of aviation's unsung epics.

The funny feeling in the pit of Mosley's stomach, the fascination which flying held for him and his career began simultaneously with the forced landing of an Army plane in 1917.

It was a Jenny, that ship. It held two flying students and no gas. It sat down on the ranch near Hickory, Okla., where Zack was born December 12, 1906. By his success in spotting Hickory, with its 13 houses, the pilot showed he was an excellent observer, but what he did to the undercarriage of that ship cast some reflections on him as a pilot.

Zack was first on the scene. He was also the last to leave. Soldiers with trucks carted the dismantled Jenny away, several days later. The two cadets bedded down with Zack until an Army car came for them.

And while the Jenny squatted forlornly on the Mosley meadow, Zack the jam artist began to come into his own. On the ruled pages of a school notebook he drew sketch after sketch of that airplane, the first he had ever seen. The sketches were primitive, but so was his subject.

He still has that book.

Mr. and Mrs. Z. T. Mosley cocked their heads first one way and another at their progeny's efforts. They cleared their throats thoughtfully and looked at each other. Well, they decided, the boy had something there. How they could have told it from those drawings serves as further proof that parents have far greater intelligence than their children suspect.

So Mr. and Mrs. Z. T. Mosley—who now live, by the way, in Oklahoma City—sent Zack to high school over in Shawnee. And there he began to study art.

Zack seemed to have a downhill pull by now. His teacher was Mrs. Margery Dodge Tapp, now art supervisor for all the schools in Shawnee and a fine artist in her own right. She coddled him. She told him he could make art a career. She insisted that he go to Chicago to study.

So to Chicago he went. He spent a year in the Academy of Fine Arts and, successively, a similar period each in the Chicago Art Institute and as a student under Carey Orr, the gifted cartoonist of the Chicago *Tribune*.

"That was a great experience," recounts Zack. "Orr tutored six of us together. He'd send us out into the parks and streets and along the lake front to sketch people and places. Then he would pull our work apart for us, helping us to see what made it tick, you know. I made one or two sketches then—

"Well, never mind; you were asking about the comic strip."

Those three years of student life in Chicago weren't handed Mosley on a platter. The platter was handed Mosley, who earned his education, day by day, as a waiter, then a checker, and finally a cashier in Harding's restaurant on West Madison street in the Loop.

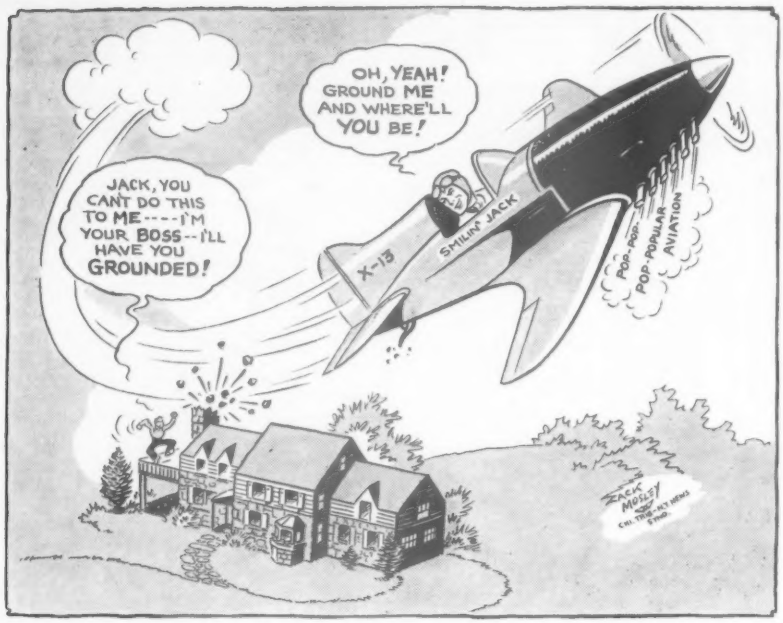
Characters for sketching came to him. Where other artists had to go looking for characters, plenty of faces passed before his eyes. He drew, sketched, painted incessantly, sleeping four to six hours a night, working for his career and his food the rest of the time.

Life dishes up some odd coincidences. It did for Zack. One was to revive his interest in airplanes and give him the idea for his present strip. He got the job of assistant to Dick Calkins, old Army flyer and successful cartoonist, and worked with him for five years—until 1933. For four of those years he did the "fill in" work for Calkins' "sky roads."

"There I was," says Zack, "drawing aviation pictures and feeling like a hypocrite. I didn't know anything about airplanes or flying, except what Dick told me and what I read in books. I read lots of those books—but that isn't flying—and I was scared to fly."

Well, he finally went up. It was a fine day in 1931, and the ship was a *Condor*. The flight, from Curtiss airport, lasted 15 minutes. He didn't learn much but it robbed him momentarily of his pesky fright of the air. He figured as how he would like to impress the folks back in Oklahoma, so he scraped together all the money he could lay his hands on to buy an air trip at vacation time. He would go home in style.

"I couldn't afford to fly all the way," he confesses. "I took a bus to St. Louis and boarded a plane there. Everything went fine until we tried to get into


OH, YEAH! GROUND ME AND WHERE'LL YOU BE!
JACK, YOU CAN'T DO THIS TO ME----I'M YOUR BOSS--I'LL HAVE YOU GROUNDED!
X-13
SMILIN' JACK
POP-POP-
POP-POPULAR AVIATION
ZACK MOSLEY

Springfield, Mo., where they were fresh out of ceilings.

"The pilot started wandering around looking for a hole. That tri-motored Ford sort of creaked every time he'd bank it around. For a half hour at a time we couldn't see our wingtips. One of the passengers went nuts and started running up and down the aisle. The co-pilot came back and strapped him in his seat, where he raved.

"And now we got little glimpses of the Ozark mountains under us. The stuff opened up just a bit and the pilot spotted a tiny, bare patch of ground right at the rim of a mountain. So he sat us down there, beautifully, without a tremor. I'll never see such a miraculous landing again.

"There was no place we could go from there, so after half an hour, when the soup cleared away, we took off again. That was another miracle. There wasn't enough room on that clearing to launch a model of a *Cub*."

The Ford winged on, to that airport at Tulsa with all the room in three counties spread out below its belly. But by that time reaction had set in on the pilot. He sat down on the installment plan. The landing gear must have survived the shocks because the ship rolled to a stop.

As the engines sighed, eight passengers tumbled out of the cabin. It has not been fairly established whether Mosley was first or second out of the door, but the fact remains that everybody continued his trip by train.

It was another year before Mosley, the jam-artist-to-be, summoned the courage to go aloft again.

"But I knew," he says reasonably, "that if I was ever going to do a successful strip about aviation—and the idea was well born by that time—I had to be a pilot. So I got Ralph Bloxom to teach me flying in his old Skylark at Chicago Municipal airport.

"It wasn't so good. My feet kept freezing to the rudder bar.

"After our final flight together, Ralph said quietly but firmly, 'I'm going to quit teaching students.' I took the hint."

For a man of weaker fiber, that would have been the point to begin selling bonds for a living. But not for Mosley. He told himself that he still didn't know much about flying except for what he gathered from books. But he had learned a lot about drawing pictures. A character named "Smilin' Jack" kept bobbing about in his head. He even had the beginnings of a plot (which, as a matter of fact, had been deviling his consciousness for five years anyway).

Zack sketched out the start of his strip and took it to New York—by train. He sent his drawings in to Capt. Joseph Medill Patterson, publisher of the New York *Daily News* and a pilot himself. Then Zack sat down in the anteroom. He sat there for eight days.

Finally Patterson called him in. Characteristically Captain Patterson said, "Your drawings could be better, but they will improve, and you know technical aviation and that's what the public wants. You're hired."

When Smilin' Jack was offered to the millions of *News* readers, he was only a Sunday feature. He ran in colors for three years before he became a daily strip, to which readers turned after glancing at the banner lines and possibly the sports pages.

This guy Jack became quite a flyer, in the newspapers. So did his daddy. Mosley went out constantly with Duke Krantz, the *Daily News* pilot, on all kinds of assignments and in all kinds of weather.

He was still scared on the takeoff, but he was determined to whip that feeling in the pit of his stomach. He

(*Continued on page 70*)

Recommends Azores

HAVING completed a year's survey of mid-Atlantic flying conditions in the vicinity of the Azores Islands, Captain George I. Thomson, D.F.C., an Imperial Airways pilot, has returned to England.

Although the islands present certain geographical difficulties, Captain Thomson recommends that the route should be seriously considered as an alternative in winter to the more direct flight from England to New York via Ireland and Newfoundland.

"With the full co-operation of the Portuguese meteorological and radio services to Horta," says Captain Thomson, "a series of experimental winter flights can usefully and safely be carried out. These surveys would furnish material which would enable us to decide whether certain schemes for improvement of the harbor facilities can be profitably proceeded with."

In the course of his surveys Captain Thompson visited each of the nine islands comprising the group, surveyed the alternative airport sites on these mountainous islands and in particular made careful daily observations of sea conditions from the point of view of flying-boat operations.

Plane Names

THE romance of long-distance flying, with swift "ships of the air" now winging their way to Africa, India, Malaya and Australia, is emphasized by the names conferred on some of the big flying boats operating on these services.

Picturesque—and in some cases singularly appropriate—are names derived from original descriptions as used by natives. Take, for example, the name *Coorong*, given to one of the Qantas flying boats. The native meaning of this is "cloud searcher"—surely a happy name for any craft which rises from the earth and soars through the air. Then there is *Cooee*, the name of a seaside resort in Tasmania—and also a call or cry as used by Australian natives.

Another flying boat name, *Coogee*, is derived from a Sydney surf-beach. And this, again, is native in its origin, meaning "mist rising from the water"; while *Coolangatta*, the name given to yet another of the flying boats, means in its native sense "high land overlooking water."

Two of the new flying boats which will be used on the trans-Tasman service, connecting Australia with New Zealand, have names derived from the native Maori tongue. One of these, *Aotearoa*, is the name for New Zealand—meaning "the long white cloud." The other, *Awarua*, is a native description of the two arms of a harbor at the extremity of South Island, used as a landing-place for canoes.

Alfred B. Bennett

MR. BENNETT HAS A PLAN

by DICK KIRSCHBAUM

Private flying in the United States needs a "shot in the arm" badly. Al Bennett, a veteran airplane operator and owner, thinks he has the answer.

THERE'S one thing about flying an airplane; it seems to melt away selfishness and the pilot, probably inspired by the wide spaces of blue on all sides of him, expands and wishes everybody in the world could fly too.

Unfortunately, however, this cannot be, mostly for economic reasons. It costs money to fly and more money to learn to fly. This point was brought home sharply to a young man named Alfred B. Bennett, some nine years ago when he was a flying cadet at Brooks Field, Texas. Somebody told Al it cost the government about $50,000 to teach a young man to fly. (Since then it has dropped to approximately $20,000.) That was prohibitive, of course, to the private flyer—and they couldn't all get appointments to the Army school.

On completion of his course Al returned to his home at Hightstown, N. J., and decided to open a flying school. All this time he pondered over the possibility of teaching youngsters to fly at a minimum of expense. He had no money. He bought his first plane with money advanced by prospective students. It was a slow and heartbreaking task but Al, having the determination to make others fly imbued in him, stuck to it and came through.

His procedure was new, so new that it occurred to Al that it might be used nationally. Nine years in the making, Al has now presented the Bennett Plan to the public.

Briefly, Al's plan is to make the government a partner in every young pilot. Like many others he feels that civil aviation is a national defense measure as well as an important contribution to the nation's welfare.

"Why not," said Al, "have the government pay any student who solos $50? And give him an additional $50 when he completes his first certified 10 hours? Certainly, this is plenty cheaper than paying $20,000 to give him his wings, even though he doesn't have a Scheduled Air Transport Rating. Non-commercial pilots would receive $100 for the first 20 hours' flying time added to their log.

"One hundred dollars is a lot of money to the young pilot. It will buy him plenty of flying time and relieve the worry that he will not be able to continue his flying because of lack of funds. If this works out—and I feel confident it will—the idea would be to make a yearly payment of $100 for the first 20 hours of flying. No individual pilot would receive more than $100 in any one year.

"This would create flying clubs and new airports in great numbers and would certainly go a long way towards solving the CAA's problem of how to get new airports in a hurry."

As pointed out before, Al started his own successful airport venture by collecting advance payments from prospective students. Listen to him tell of the case of Larry Holmes at Millville, N. J.

"Larry wants to fly, but lacks money. When I say he wants to fly, I mean he wants to teach flying. He will hire an instructor to run his airplane until he gets his own instructor's rating. He thought a good place to start an airport would be at his home town. He called on the mayor who said the town had always wanted an airport. A public-minded citizen fell in line and offered land to the city. At this writing Larry is rounding up all the prospective flyers he can find to raise money for the down payment on a new airplane.

"Now," said Al, earnestly, "if my plan were adopted and ten students should turn over to Larry coupons issued with their student licenses, each worth $50 and redeemable on soloing and $50 on completing ten hours solo, Larry could take the coupons to an airplane finance company and get immediate delivery on a ship! On the other hand a group of prospective pilots could pool their coupons, buy a plane, hire an instructor and start a new flying unit.

"One-sixth the price of one battleship or $10,000,000 will produce nearly 100,000 pilots! Being of a pump priming nature, this sum will undoubtedly be doubled or tripled by the flyers, thereby making available $20,000,000 or $30,000,000, most of which would be used for airport development and purchase of new planes."

Al points out that this plan might lead to the establishment of a "Home Air Guard."

(*Continued on page 78*)

The state of Tennessee put a "subsidized flying" plan into operation with outstanding success. Above are some Tennessee students with one of the state-owned airplanes.

Farewell,

by JOHN A. COLLINGS

To the departing tri-motored Ford this article is affectionately dedicated. It is a eulogy to that remarkable airplane by her test pilot.

To the New Yorker magazine and Author Lee Strout White POPULAR AVIATION *extends its thanks for inspiring this article.*

The airline circular at left and the advertisement below represent part of the pioneering work the Ford did in commercial aviation. The advertisement appeared in 1928 and shows the Ford as the first luxurious, safe airliner.

FIRST TIME UP!

You settle back in your wicker chair a little nervously as the engines roar. Then a burst of speed across the flying-field! Forty miles an hour . . . fifty-five! Someone shouts:

"Watch the wheels!"

Unless your eyes are fixed on the great balloon tires no sense perception tells when you have left the earth. There is only an astonishing feeling of stability; then comfortable relaxation as the motors are throttled down. The giant, tri-motored car moves upward on a cushioning ramp of air. . . .

Gradually you experience a sensation that is certainly one of the most extraordinary man has ever felt. You are transcending human nature. You feel immeasurably superior to the crawling beings in the miniature world immersed in silence two thousand feet below. Though ordinarily you may suffer from fear of heights, this fear does not touch you now, *for there are no lines of perspective drawing you earthward!*

Streets, monuments, buildings, vehicles and living creatures, are fractions of inches in size. Hedgerows, fences, and symmetrically plowed fields of red and brown earth form rug-like patterns, while distance gives the raw surfaces a velvety texture.

Boats, moving along a river the color of green onyx, push threads of cotton from their bows. Trains wind through the hills with lazy deliberation. Automobiles creep along ribboned roads. Sheep, cattle, horses graze heads downward in the fields, unaware that you are watching from the sky.

The air of other-worldliness that hangs over the earth below is emphasized by the fact that you are hardly aware of forward motion, *though moving twice as fast as the fastest express trains*, and it is as easy to stand poised on one foot in the cabin as on the floor of your own bedroom. Your fellow passengers move freely about, shifting the ten wicker chairs companionably, to play cards, to typewrite, to make sketches, or, gathering in groups, first on one side of the plane then on the other, to study the panorama below.

You soon accept the truth of the reported safety of these giant commercial planes. What if a motor fails? With two, the plane can continue to its destination! If two fail—the remaining motor can extend the angle of descent to cover an area almost half the size of Delaware. And if all three fail the plane has a gliding range of miles.

Ford tri-motored, all-metal planes have demonstrated railroad efficiency for over a million miles of flight, carrying mail, freight and passengers . . . in tropical regions, in arctic regions, at sea level and over the highest mountain ranges on this continent.

Events of the last twelve months have put commercial flying in America on the level of stable industries. Great businesses have accepted it as a dependable means of swift transport, cutting two-thirds off railroad time. Business men no longer think of the mere thrill of "going up"; they think rather in terms of profitable service.

In the modern business world, the dawn of each new day presents a different scene . . . new products, new competition, new markets. To meet its challenge, you must be prepared.

When the occasion comes for your first time up, it will not be to "joy-ride" in an antiquated and hazardous machine; but far more probably it will be to reach some distant meeting-place in advance of business competition!

FORD MOTOR COMPANY

I SAW a picture of a Tin Goose that was taken somewhere in Central America not long ago. A big section had been cut out of the top of her firm old back. A derrick was loading huge chunks of mining machinery through the spinal incision into her innards. That picture jolted my heart a little—and I mean physically. I know why, all right. I had seen an old love; a sweetheart such as a man finds just once in his lifetime—if he's very lucky.

Please excuse me for being a sentimentalist; we pilots aren't supposed to be. But when it comes to looking back on my association with the Tin Goose, well, there's something that will put a lump in any old-time pilot's throat. We fellows always called her the Tin Goose; technically, she was the majestic tri-motored Ford transport. . . .

The grand old lady of American aviation is fading from the glittering picture of modern aeronautics—a picture which once showed the Tin Goose as the most brilliant star in its composition. There never had been an airplane, before or since, that could equal the Tin Goose in her way. She was an aeronautical miracle that could only happen once; literally she was uncanny. The rise of air transportation followed along in her wake. The first Ford airliner, powered with a single 400 h. p. Liberty engine, was built in 1925. The last tri-motored Tin Goose (No. 195) was built in 1929. And today? She's carting ton after ton of machinery, rice, gold, livestock, corn, logs, butter, eggs, chicle, tractors, furniture, and even live horses over Central American mountains.

I am not deceived by that picture I mentioned. I know the end is in sight for the old girl. We in aviation are all wrapped up in talk of higher speed airliners, sleek "sub-stratosphere" transports that will carry dozens of passengers 200 miles an hour—and transoceanic airliners. We think only in terms of the big airliners we fly today, which have highly perfected instruments to help us. There's none of that primi-

Tin Goose!

The author is shown with Colonel Lindbergh (right) while they were laying out what now is TWA's route from New York to Los Angeles. Mr. Collings is a TWA superintendent today.

tive feeling you had behind the controls of a Ford.

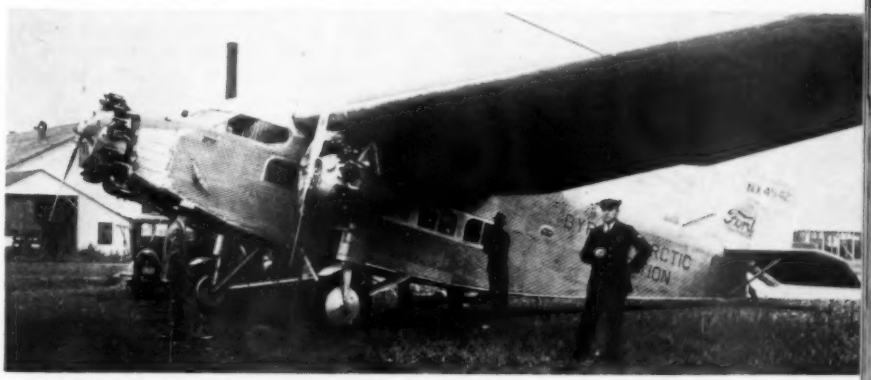
As I say, the Tin Goose sported none of the fancy, highly scientific devices our modern airliners carry. But, as an airplane, she did more commonplace and heroic hard work than any aircraft known before. Today, in keeping with her valiant reputation, she is doing even tougher work than she did while pioneering the nation's airlines. It seems to me (and many of my friends who used to fly Fords) that the old girl transmitted many of her fine and rugged qualities to those who flew her. I always looked forward to those pleasant but noisy interludes high in the sky behind a Ford's controls. She was the most sociable airplane I've ever known. Her three racketing engines seemed to discuss the world in general with pilots who flew her. Oh, there was plenty of noise, all right; I don't know whether I'd have loved her as much if she hadn't kept up her ear-splitting conversation. Literally, I loved the old Tin Goose for the same reason so many people will always look back longingly on the rattle-trap, ear-splitting Model T "tin-lizzie."

Those pilots who had never flown a Ford had never experienced flying in its finest, most intimate form. She acted like a dignified dowager on the controls; smooth, graceful, and as sure-footed as a Seeing-Eye dog. Her stability was something to marvel at. The man who flew her was like a king enthroned. Though she had few of the blind-flying instruments we have today, the Tin Goose tackled some tough weather in her time. The method was simple; the pilot merely set her controls in neutral, trimmed her stabilizer, then let her fly herself. That's all you had to do—give her her head and she'd take you there.

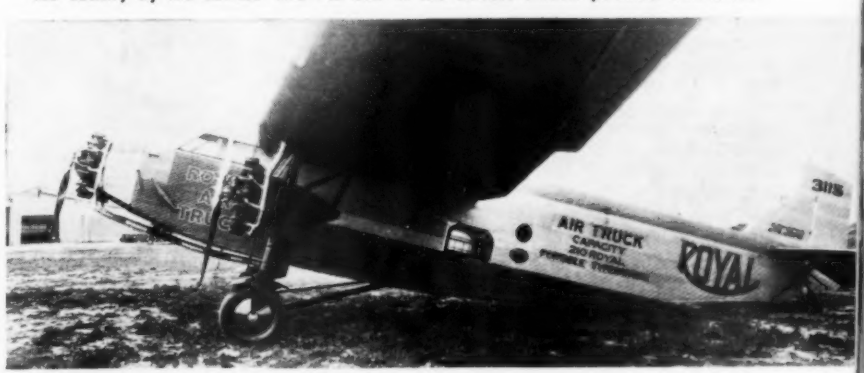
Most remarkable quality of the Tin Goose was its ability to take its tremendous loads in and out of fields we'd never look at twice nowadays. And, in its palmy days, the Tin Goose could get off faster than anything in the air. The reason was simple. You merely placed the palm of your hand on her three throttles, shoved hard, then sat there amid the turmoil till her altimeter said 1,000 feet. Then you'd ease the throttles back to cruising and she'd calm her calamitous yowling to ordinary conversation voice. All the movements were very positive and conclusive.

Once aloft, you had little to do but sit and wait while the ship streaked (for those days) to her destination. In the air, the Ford was majesty itself. Her nearness to being alive was uncanny; even the passengers could feel

The Tin Goose below carried Byrd over the South Pole. The explorers left the ship buried in the ice, dug it up on their second expedition, started the engines easily.



The Ford below served as a "flying truck" and was flown thousands of miles all over the country by the author. This was one of the earliest models powered with J-4's.



Many a veteran airman has gasped at the use to which Pilot Harold Johnson puts his Ford today. Below is one hair-raiser; Johnson also does loops, spins and even rolls.

One addition to the old Tin Goose was this type of retractable mail compartment.

it. If nothing else, the Tin Goose surely *sounded* alive. The heyday of the tri-motored Ford was, of course, some time before much thought—if any at all—had been given to sound-proofing. In the cockpit the pilot and co-pilot cupped their hands and shouted into each other's ears. In the cabin, it was only slightly better. To talk with your neighbor—even across the aisle—was a mighty effort. After a five or six hour flight, passengers were apt to walk away from the plane sounding like cheer leaders at a football game. From the passengers' standpoint, the smartest idea was to write notes.

But for all the racket, the Tin Goose was a remarkable airplane. It was as modern as the advent of its single corrugated cantilever wing could make it. With an engine tucked snugly under each arm and another in her nose, the Tin Goose out-engined anything in existence. Originally, all its engines could do was to zip its 12 passengers, two pilots, and a few hundred pounds of cargo through space at around 90 m.p.h. Then Ford engineers discover that, by simply raising the two wing engines and adding N.A.C.A. cowlings, the cruising speed was phenomenally increased—to 125 m.p.h. At best, her range was 500 miles, her ceiling 22,000 ft.

With all these more modern arrangements, though, the first Tin Geese were comparatively primitive. Their pilots never had difficulty in finding out how much gas was left in the tanks. The method was simple: the aeronaut climbed up through the top of the cockpit, unscrewed the caps of the tanks and thrust a long stick into the cavern. Like a doctor sticking a thermometer in a patient's mouth. There was no mistaking the information gathered in this manner. Usually, there was one or two of these sounding sticks secreted somewhere in the cockpit. Refueling a Ford was sure to take the high-hattedness out of the most dignified pilot because he had to unbend, whether he wanted to or not.

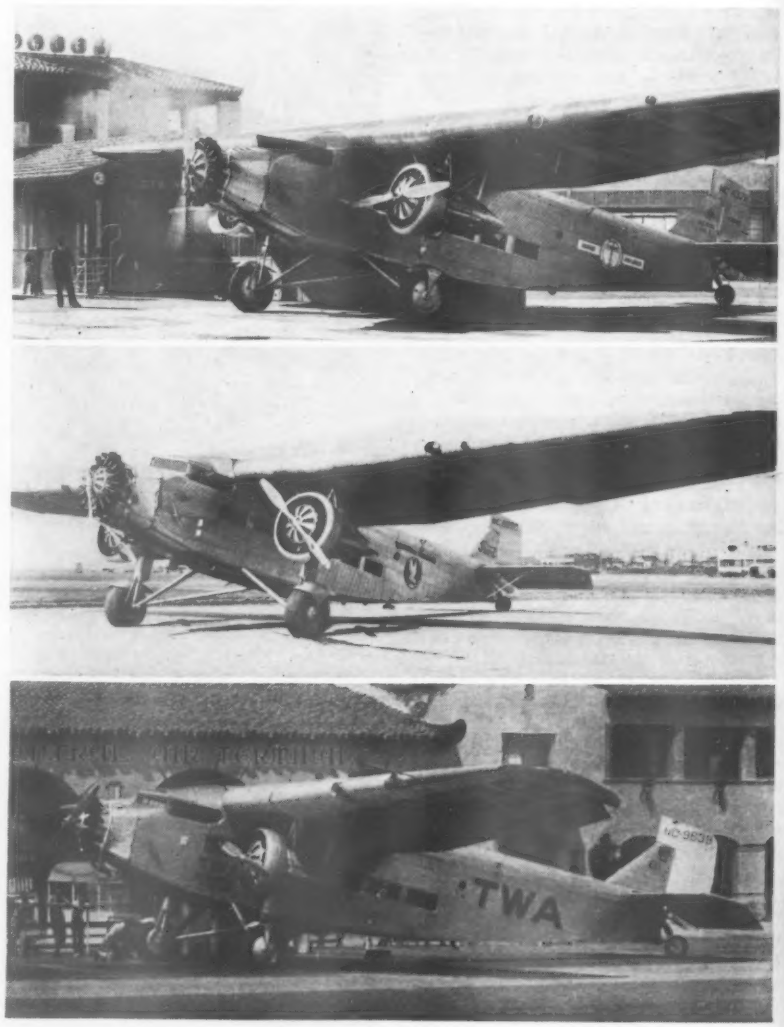
But, with all her practicality, the Tin Goose had an utter disregard for true streamlining. Her big, blunt engines just yanked her through the atmosphere, with almost complete unconcern in relation to the physical law of head resistance.

The day an airline invested in a tri-motored Ford was a glorious one. The buyer knew he was getting an airplane with which he could fly any and everything from hogs to hammocks. That was one thing about the Tin Goose; she was never snooty. She did her work and did it well. Today the few remaining Tin Geese are much in demand in the remote corners of the world for such jobs as hauling mining machinery over mountains deep in Central America. The Tin Goose is in demand for this work, principally because she is one of the few old-timers that still are capable of such heavy-duty, modern-day hard work.

Yet, the Tin Goose has had her share of "white collar" work, too. In her day, the Ford *was* the American aviation scene. Tin Geese flew every major airline in the land. Even Henry Ford himself used a few to operate an airline between Chicago and Detroit. A Tin Goose went to the South Pole. The Army, Navy, and Marines used them as transports for years. They did everything but fly the Atlantic—and the only reason a Tin Goose didn't was because there was too much work at home for her to do. In 1931, for instance, Tin Geese flew 10,467,167 miles.

Thinking back, I guess the only thing about the Ford that gave us cause for unpleasantness was the difficulty involved in starting her engines in cold weather. Lordy, we used to twist and wind those inertia starter cranks until we literally were blue in the face. At times we even had to drain her congealed oil and heat it over a bonfire. I don't suppose you could blame the Tin Goose for that; she was just born before the days of electric starters. But once we got all three engines running, she was again more vibrantly alive.

We didn't have to worry about retractable landing gears. We didn't have to bother with "inches of manifold pressure" and whatnot—simply because



The Ford was the backbone of all the major airlines of the nation. Shown at right, from top to bottom, are Fords of United and American Airlines and TWA.

there was no such thing. The engines weren't supercharged. No Tin Goose ever saw a controllable pitch or constant-speed propeller. In other words, whatever took place was strictly an agreement between the pilot and the airplane. She'd snarl and whine until the pilot worked the three throttles to the point where the engines were synchronized—more or less. This, of course, only added to the clatter and bedlam of the Ford in general. Today we have scientific synchroscopes.

We got to love that noise. In fact, I think I'd have felt there was something radically wrong if her familiar racket hadn't been there. There was something comforting about the constant rattling and rippling of her corrugated skin, the clatter of the engines and the other contemporary noises like the slapping of the control cables (they were hung on the outside!) on the fuselage.

But as the years went by, the Tin Goose began to "go Hollywood." Somebody decided to install those newfangled "pants" on the landing gear. Then they prettied up her face with sleek cowlings around the outboard engines. Then someone went to work on her insides—and before they got through I saw anti-splash flower vases on the cabin walls, fancy seats (replacing wicker chairs) for the passengers; in fact, all sorts of fancy gadgets that smacked mightily of the era of "buy the latest hootnanny for your Model T." One typewriter manufacturer turned his Ford into a "flying showroom." So did a canned-foods company.

Then, too, Ford engineers added bigger engines—*Wasps*—which made the old Tin Goose zip through the air with even more disregard for time or space. I guess she got a little *too* snooty in her later days. In the pre-elegant era we used to taxi up to any old gas pump and shove the first available nozzle into her tanks. If we happened to land in a convenient stubble patch (which we did, with no compunctions, when we felt like it) there was always a farmer or gas station somewhere near who would sell us a barrel or two of gasoline. Getting the gas into her tanks under those circumstances was a picnic. Usually, we'd siphon it into five-gallon

Toughest job on a Ford was starting her engines by hand in cold weather.

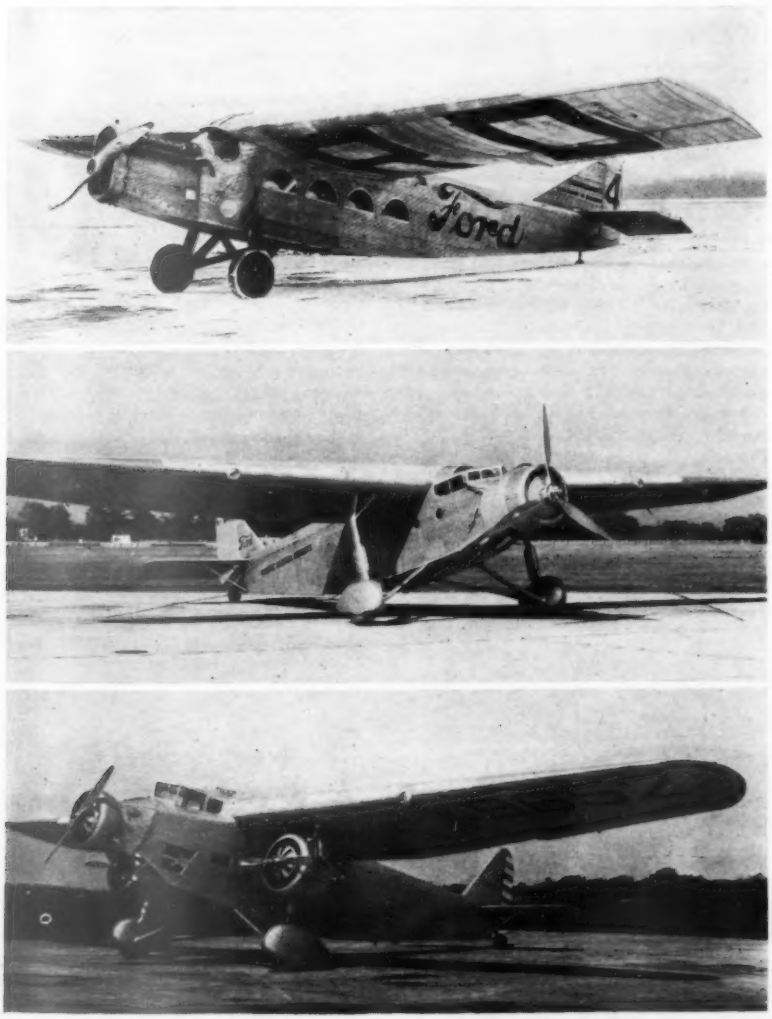
cans, carry them up through the cabin to the cockpit, lift them up through the hatch to the wing, then carefully and laboriously pour the gas into the tanks. In all cases, a chamois was a vital necessity. It would go inside the funnel to keep out the ever-present stray bits of dirt and water.

But this nature-in-the-raw procedure faded with the advent of the ultra-conservative operations of the scheduled airlines. If the Tin Goose hadn't been the lady she was, she surely would have been spoiled by her later-life treatment. . .

As I recall it, the tri-motored Fords were pretty complete when they came off the production line. There were a few thingamabobs that were added from time to time—like the splash-proof flower vases. Then, a few changes were made in the basic design of the ship. For instance, the first Tin Geese were built with J4 engines. That was in 1925 when Major R. W. "Shorty" Schroeder did the flight testing. These first ships had open cockpits; the drag they caused was not considered important. Later, it was decided they looked kind of naked that way. So the cockpit was glassed in. Soon, the J5 replaced the J4's. Then, when *Wasps* were installed, it was my privilege to put the old gal through her test flights. Then came J6's. Then someone devised a retractable baggage compartment which went into the underside of the wing, one on each side.

Few spare parts were available—nor were they needed. A complete set of tools came with each ship, which just about assured a Tin Goose of a long and rugged life. About the only thing we might have asked for in those days would have been a set of anti-rattlers or anti-vibrators. The Ford could develop more vibration noises and rattles than anyone could ever stop. But that never worried us; she got along

(*Continued on page* 85)



Little-known Fords were the first model (top), a trim single-engined freighter and the experimental bomber (bottom) which crashed during Air Corps tests.

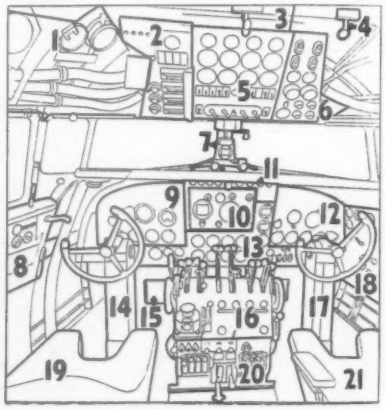
Making an Air Shot

THIS photograph is from Hollywood and is just another example of the glaring inaccuracies so prevalent in practically every air-movie ever turned out. This latest film is called "Wings of the Navy" and is produced by Warner Bros. The story, of course, concerns Naval aviation entirely yet, the leading airplane in the above picture is far from being a Navy ship, actually is a privately-owned Stearman. Errors like this still are the rule in Hollywood air pictures.

Meanwhile, the airplane in the rear of the above picture also is interesting. It too is a Stearman and is one of the camera ships used in making the picture. Notice that, between its wheels, an automatic camera is mounted. At the moment it was shooting the ground-strafing scene being enacted by the leading ship.

The DC-4's Cockpit

INTERESTED in what the DC-4's pilots are faced with? The photo and diagram below show you and the following tells you: **Section 1:** Brake test gauges and wiring conduit. **Section 2:** Propeller feathering pump switch, engine synchroscopes, feathering controls, lighting rheostats. **Sections 3 and 4:** Generator and auxiliary ignition switches. **Section 5:** Oil, cylinder and carburetor temperature indicators and switches, various light, de-froster and ignition switches. **Section 6:** Various gauge warning lights. **Section 7:** Rudder tab and unfeathering controls. **Section 8:** Window lock, microphone, radiophone panel, retractable landing light handle. **Section 9:** Flight instruments and space for blind landing instruments. **Section 10:** Gyro-pilot, flight controls, dump valves. **Sections 11 and 12:** Engine and flight instruments. **Section 13:** Landing gear and flap indicators, gauges, exhaust gas analyzer. **Sections 14 and 17:** Control wheels and columns. **Section 15:** Rudder and brake control. **Section 16:** Propeller pitch, throttle, elevator tab and fuel selector controls; fuel gauges. **Section 18:** Instrument and equipment gauges, selectors, co-pilot's microphone. **Sections 19 and 21:** Pilot's and co-pilot's seats. **Section 20:** Carburetor temperature control, controls for flaps, landing gear, mixture and parking brake.



Airport Survey

A SURVEY of all existing airports and aviation facilities in the United States is now being carried on by the Civil Aeronautics Authority and the Works Progress Administration. This is the first step in the national airport "development-planning" program which was authorized by the last Congress in the interests of furthering aviation progress in this country.

Creation by Congress of the new Civil Aeronautics Authority, that they might prepare and propose, with the aid of already existing organizations interested in aviation, a national plan of coordinated airway and airport development, grew, in part, from the National Airport Conference held in Washington in December of 1937. Fourteen Federal, state, municipal and private organizations and well-known authorities on aviation expressed an almost unanimous desire for a national airport plan at this conference. Resolutions were adopted at this and other conferences urging the enactment of legislation and the allocation of funds necessary to effectuate immediately a national airport-development plan.

The survey now in operation by the Civil Aeronautics Authority and the WPA was authorized as the first step in such a national plan by the act of Congress which followed. Relating to this survey the act reads, "The Authority shall, through the Administrator, make a field survey of the existing system of airports and shall present to the Congress not later than February 1, 1939, definite recommendations (1) as to whether the Federal government should participate in the construction, improvement, development, operation, or maintenance of a national system of airports, and (2) if Federal participation is recommended, the extent to which, and the manner in which the Federal Government shall so participate."

It was deemed advisable to use the personnel of the Works Progress Administration to assist in the preliminary survey, inasmuch as the WPA already had men in the field and in the light of its airport improvement program during the past three years for over $90,000,000 worth of work on the construction and improvement of 622 airport sites in the country.

New Radio Twist

ARMY AIR CORPS engineers at Wright Field have discovered that it is entirely practical to install radio equipment in aircraft so that the ship itself serves as an antenna. This practice, Army men state, will eliminate the loss or breakage of wire antenna due to icing or other weather conditions. No announcement, however, has been made concerning the adoption of this practice with Air Corps aircraft.

TARGET TOWER

Many months ago, Britain's Royal Air Force announced the Hawker *Henley* shown on this page as "our latest high-speed light bomber" and added that the airplane already was "in large production for service squadrons". Then, for some reason, no more attention was called to the *Henley*. Only recently did it appear again, this time under a different guise. The ship, as shown here, now is to be a target tower for anti-aircraft. In the photograph below the special target towing equipment can be seen attached to fuselage and tail.

YOU CAN'T GET AWAY

So you think you're a hot pilot? The author, one of the most famous airmen in the country, says you're not and offers a few examples and suggestions to prove his point.

THE pilot started his spin at between 1,200 and 1,500 feet.

He spun down several turns, then reversed the direction of the maneuver. The excited spectators at the central California air meet began to gasp as the gap between plane and ground narrowed alarmingly. Some got to their feet.

Too close to the ground the pilot, anxious to give the crowd its money's worth of thrills, stopped the spin. He dived, pulled out too sharply and mushed into the ground wide open. The ship burst into flames.

Aviation got another black eye.

Yet the crash was purely a personal matter between the pilot, his ship and simple aerodynamics that he probably didn't take into consideration.

Why did he crash?

Because he advanced himself too rapidly as an exhibition pilot. He became reckless and began stunting at a low altitude before he was qualified for precision aerobatics.

Consider his record. He was an old-timer. For years he had flown conservatively. Then one day not many months ago he decided to go in for exhibition flying at air meets. He worked out a stunt program, practiced it at high altitudes and then started a series of shows.

Each performance brought him closer to the ground. He did not understand many things about aerobatic flying that he would have learned over a long period of practice at high altitudes. He had not experienced the many difficulties a pilot will encounter during the first two or three years of aerobatics. Nor did he understand the several methods of avoiding trouble while doing this type of flying at low altitudes.

But he believed himself to be a safe exhibition pilot and he went right ahead with his show contracts. For several months he seemed to be doing all right. Then he tried something he couldn't get away with.

He's not original in that. I could name dozens of others. There are far, far too many write-offs these days because various factors, some of them virtually unknown to embryo stunt pilots, catch up with the experimenters. Not long ago—to show how far-reaching this failure to know how to stunt is—I saw a veteran of 15 years of aerobatics fail to make sufficient allowance for the inevitable "mush" at the bottom of a dive, watched his ship give a perfect imitation of an overloaded elevator slipping below the floor at which it was supposted to stop.

The pilot just scared himself by cutting down grass that wasn't more than three inches high. He didn't get his color back for the rest of the day. Had he begun his "pull out" a split second later he would have been killed.

Here are two cases of trouble with a "down and up" maneuver, or the making of a perpendicular dive and pulling out of it. Now let us consider the tight vertical bank. We might refer to it as a "horizontal dive and pull out" because the airplane will "mush" exactly the same as it did in the perpendicular pull out.

In fact, if the stick is pulled back too much the airplane will do a snap roll and probably go from the snap roll into a spin. This is confusing to the average pilot because at the time of the start of trouble the ship probably has an indicated air speed of from 50 to 100 percent greater than its stalling speed for straight flight.

A few years ago I watched a student pilot in Oregon as he practiced landings. He had a thrill-seeking complex. Instead of making a gentle U-turn he made an abrupt 180° vertical bank in a glide to come in for his landings. In other words, for the purpose of this article, a horizontal pull-out.

"You should make a more gentle turn," I told him.

"What's the difference?" he demanded, in a know-it-all manner. "If I keep my speed above the stalling point I'll never get into trouble."

He indicated that he was in no mood for a long-winded explanation, so I didn't argue with him. I guess I should have, for a few weeks later when he was gliding in for a landing he make his 180° vertical—almost. He stalled, snap rolled out of the bank, and spun in. Undoubtedly he had more speed than his stalling point in level flight.

He and hundreds of others are dead today because of the pull-outs from perpendicular dives, the tight vertical banks (horizontal pull-outs) at low altitudes, vertical banks while in glides for landings, or when motors cut out and pilots try vertical banks to get back into airports in the vain hope of making safe landings. And this is not all. There's the pull-out at the top of a loop, which we can refer to as a "vertical pull-out."

For years I've heard pilots say:

"This ship of mine won't loop."

It's not the ship, as far as I've learned from my investigation. I have flown ship after ship and have had no difficulty in looping them in the face of their owners' complaints. The answer is again failure to understand what is happening aerodynamically to the ship.

This pilot is doing the kind of flying most pilots would be foolish to try. Not long after the picture below was taken, the pilot flew his ship right into the ground. Proving that the best are none too good.

WITH IT

As told to

EDWARD CHURCHILL

by

TEX RANKIN

Although Tex Rankin is the nation's leading stunt pilot, he's the safest. An outstanding instructor, he has trained some 3,000 pilots.

Fatalities from spinning or rolling off the top of a loop are relatively few—but they are dangerous. Too much speed and too little speed are the principle faults. Strange as it may seem, too much speed causes pilots to do improper loops than does too little.

Now that we've covered the three types of pull-outs, let's go into a huddle on the simple explanation of the accidents—proof again that you can't go against principle and get away with it.

The whole trouble lies in centrifugal force, which is measured by an instrument called an "accelerometer." This instrument measures the centrifugal force in "G" units. The accelerometer is more commonly referred to as a "G meter."

What is a "G"? The reason that we use this unit of measurement is that it is so simply understood. The normal pull of gravity is one unit, or one "G". For example, a ship of let us say 2,000 gross weight in level flight is at all times subjected to a pull of one "G". That is, its normal load opposed to gravity is 2,000 pounds, which is resting on the supporting surfaces.

If this plane is put into aerobatic maneuvers—let us say any of the three types of maneuvers mentioned above—centrifugal force enters into the picture because of change of direction or deviation from straight, level flight. Our figurative or actual accelerometer shows that because of centrifugal force the weight is probably three "Gs." At this time, the supporting surfaces are carrying three times the stress encountered in normal flight, or 6,000 pounds. The surfaces are carrying 200 per cent more load and the stalling speed of the ship has been increased by approximately 50 per cent, or even more. That's the secret of so much of the trouble. An airplane which stalls in normal flight at 50 m.p.h. stalls now at not less than 75 m.p.h.

Consider the stunt pilot who crashed in his perpendicular pull-out after recovering from his spin at low altitude. He pulled out too abruptly, sent his "G" load up to perhaps six or eight times above normal, stalled at high speed and mushed in. Consider the Oregon student with his "horizontal pull-out." In his vertical banks he increased his swing loading several times above that in normal flight, didn't know that his stalling speed consequently was far greater, and spun in. Apply this same principle to your loop and you discover that at the top of the loop you stall *up* and out of your circle due to centifugal force and that, because your wing tips stall first, you usually go into a snap roll.

"G" and "gravity" are misleading words in the sense that while "G units" are rated on weight or gravity they are actually caused by centrifugal force in any change of direction. The faster the speed and the more abrupt the change in direction, the greater the "G" load.

(Continued on page 87)

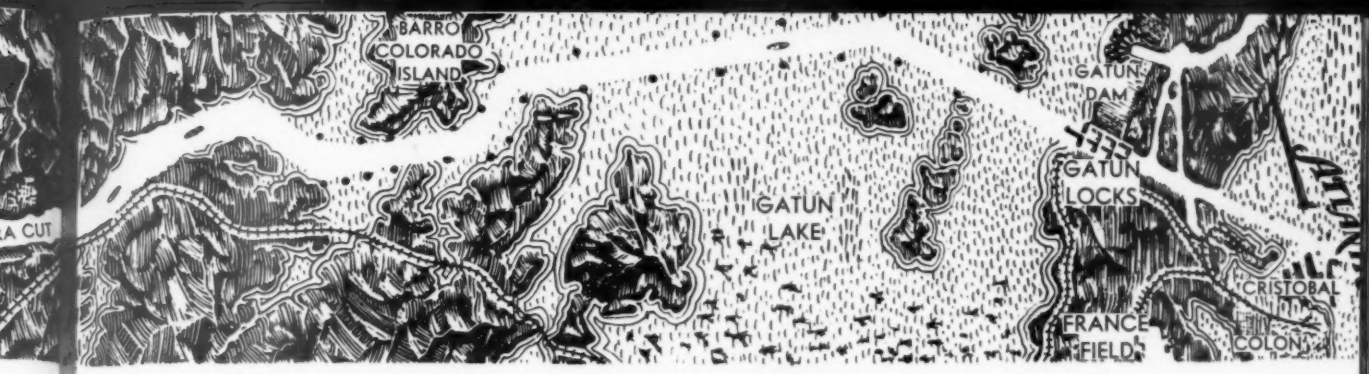
Below is the remains of an airplane. The pilot thought he was good enough to do low-altitude aerobatics. He wasn't—and paid for it with his life. Such accidents hurt aviation immeasurably.

PACIFIC TO ATLANTIC

Panama Airways passengers prefer the tri-motored Fords (above) to modern Douglases. They get a better view of the Canal below.

THE fastest airline time from coast to coast is *not* a matter of hours. It's a matter of 29 minutes!

Coast to coast doesn't have to mean New York to San Francisco, or Los Angeles, or Seattle. Cristobal to Balboa is coast to coast, and there is an airline flying two round trips every day on schedule over that "transcontinental" route. The line is Panama Airways. In addition to its daily schedule, has provision for anything up to 36 round trips a day when there is a special demand because of the presence in port of a cruise ship of one of the steamship lines.



—IN 29 MINUTES!

by KURT RAND

One of the world's busiest—and least known—airlines does an unique business over its 45-mile "system". And the coast-to-coast round trip is only $14.

It's coast to coast all right, but the strange thing about this operation from the Atlantic to the Pacific is this: when you are at the starting point on the Atlantic side you don't head west to get to the Pacific. You fly east and south.

Look at a map of the western hemisphere. The Isthmus bends upward in a crook which traps the Pacific Ocean's "Golfo de Panama" into an area which is due east of the Caribbean's "Golfo de los Mosquitos." Panama and Balboa on the Pacific side are southeast of Cristobal on the Atlantic side. So you fly southeast from the Atlantic to get to the Pacific.

Which is an interesting point, but not the factor which gets tourists from America standing in line for tickets on this 35-mile airline which Pan American Airways inaugurated in December, 1936, with Panama Airways as its operating company, and on which the operations and traffic departments now are getting ready for their biggest season to date. Why? Because cruise ships are steaming out of New York and other ports this year, bound for Caribbean ports, including Cristobal, in unprecedented numbers. And because these cruise passengers fly over the Isthmus when they call at Cristobal. It is the unrivalled view of the Panama Canal from the air which gets people enthusiastic about Panama Airways.

And many of them prefer to ride in Panama Airways' oldest equipment—its tri-motored Fords. That Mr. Ford did a good job when he constructed those old tri-motors is nowhere more evident than in the Canal Zone. There are Douglas DC-2's available too, and there also are occasions when a Douglas DC-3 is pressed into service. At times when there are going to be two, or maybe as many as three or four cruise ships in port at the same time, and the traffic department of Panama Airways knows that the demand is going to be great, a whole fleet of planes goes into action.

But people like the Fords because of the high wings. They fly down the Canal because they want to see the Canal—and the Fords have always been recognized as giving the passenger an unexcelled view from the window. They don't have the speed of later transport craft, but Panama Airways will remind you that the route is short—35 miles—so that more speed would make a difference in time of only a few minutes. And Panama Airways' passengers don't want to get there any faster anyway—because they're sightseeing. Also these Fords may be older chronologically than the planes in which you ride on most airlines, but airplanes always are replaced not because they are no longer serviceable, but because of technical obsolescence. Newer, better, faster equipment has to be purchased to meet the competition of other lines despite the fact that the airplanes are far from being worn out.

Panama Airways does not have that problem of technical obsolescence with respect to the Fords—they do this sightseeing job superbly. And with Pan American maintenance, the Fords probably are better airplanes now than when they were built, if anything.

The little route on which the Fords, together with the DC-2's and the DC-3's, operate is the baby of Pan American Airways System, in point of mileage. It comprises six-one hundredths of one percent of Pan American Airways' total route mileage, which is now 53,166 miles. It just misses being the shortest airline operated by an American company. The distinction of being the shortest belongs to the Wilmington-Catalina Airline which operates over a 31-mile route between Wilmington, California, and Avalon, on Catalina Island. The Canal route is four miles longer.

As compared with such scheduled air operations as the 2,400 mile flight from San Francisco to Honolulu, which is the first leg on Pan American's 9,000-mile route to the Orient, or to the service across the North Atlantic between the United States to Europe which now looms as a certainty for 1939, the transisthmian service of Pan American Airways is an infant indeed—in mileage.

But it is a baby with respect to mileage only—in traffic and operations it is one of the busiest little airlines in the world. Just swinging into its winter season right now, the Panama Canal route is preparing to give service to a big percentage of the 20,000 passengers

Robert Fowler flew this seaplane across the Isthmus of Panama on April 27, 1913.

who will be in and out of Cristobal aboard 65 cruise ships scheduled to call at the Canal Zone during this tourist season, as well as to passengers from ships making regular calls on their year-round passenger schedules.

The tourist season in that part of the world comes in the winter months. It gets into full swing around Christmas time and continues through January, February and March. Last year, during the season, 43 cruise ships carried 16,000 passengers in and out of Cristobal. More than 3,000 of them flew on Panama Airways during their visits. With additional ships sailing this winter, and with all the ships reporting heavy bookings, the prospects for 1938-1939 are, to say the least, bright.

Here's the way it works—

There are, first of all, the regular passengers between Cristobal and Panama. There are enough of them, between residents, and passengers aboard regular ships through the Canal, to warrant a regular daily schedule of two round trips. The ships in transit through the Canal contribute passengers who fly for two reasons—one, to get the opportunity for Canal sightseeing; two, to skip ahead of the ship and have a day ashore at Balboa and Panama—or at Cristobal if traveling in the other direction. That's the basic, regular traffic.

Some of the cruise ships, of course, pass through the Canal, proceed on down the West Coast, through the Straits of Magellan and back to the United States by the South Atlantic and Caribbean route. There are more South America tours by steamship—and by air, too—this year than ever before. The tourists on these cruise ships through the Canal fly ahead of their ships just as do passengers on the regular liners.

But the greatest number of cruises are those to West Indies ports, including Cristobal, and these ships contribute the big volume of Canal sightseers. All the cruise directors and pursers have the dope on trips ashore in the Canal Zone, which include this air journey, also a train journey along the Canal route to Panama. In some cases tourists elect to have two looks at the Canal—one from the train and one from the air—and there is an arrangement providing for the combination round trip.

If a majority of the passengers elect this combination arrangement it may mean that planes fly full up in one direction and with light loads in the other, but sometimes things get so busy that this situation actually is a blessing. When there are two or more ships in port at the same time and the reservations are particularly heavy, the combination passengers from one ship are booked to fly on the outward journey to Panama, and return by rail. Then the passengers from the other ship are sent out by rail to return by air. One day last year there were four ships in port at Cristobal at the same time. Was that a busy day!

But Panama Airways is geared to take care of the peaks when they come. Its

(*Continued on page 72*)

The Navy Goes Tricycle

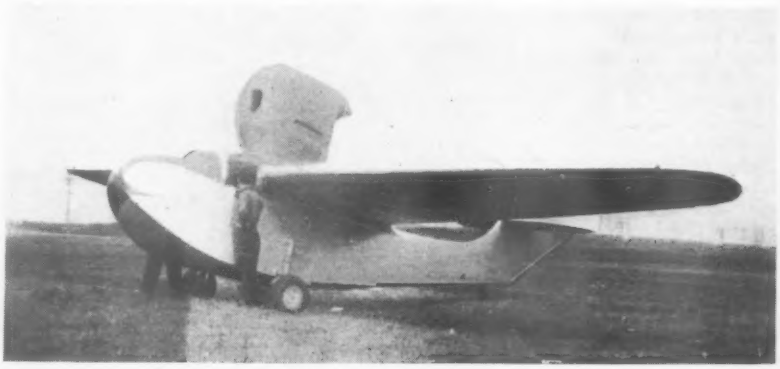
ABOVE you can see at a glance how Naval aviation engineers have altered a Northrop BT-1 for tricycle landing gear experiments. One of POPULAR AVIATION's correspondents snapped the unusual-looking ship as it took off on a test flight one day recently.

It is significant that the Navy is testing tricycle gear on comparatively high-speed equipment. It seems fairly obvious that a bomber like the Northrop above would have much safer ground characteristics with the three-wheeled undercarriage. Landings aboard aircraft carriers particularly could be revolutionized by this method.

By comparing the two photographs above, the changes can readily be seen.

A New Light Amphibian

LATEST attempt to crack the market for a cheap, practical amphibian is the clean-looking monoplane shown below. It has been built by the White Aircraft Co. of Leroy, New York, and now is undergoing tests, presumably to obtain its Approved Type Certificate. This ship is a successor to the Argonaut amphibian and generally follows that ship's original lines. The White is powered with a Ranger inline engine, is built of spruce, plywood and fabric.



How does it feel to suddenly find yourself stranded high in the substratosphere without oxygen? An Army airman tells you here.

by LIEUT. DUKE GURNETT

The author at the controls of his fighter.

INTO THIN AIR

IT is a warm morning at Langley Field, with a hot, summer sun beating down from the blue sky above. I report to my squadron after a hurried breakfast at the Bachelor Officers' Mess —hurried because this is to be my first high altitude hop with the use of oxygen equipment. The highest I had ever been at the Army flying school was a sneaked 18,500 foot attmpt (I was supposed to be out practicing "Lazy 8's"), from which height I soon descended because of that sleepy feeling that started to creep up on me because of the thin air. But this flight today was to be a different experience. Higher. Much higher. And with oxygen. Great stuff—something new!

I go into the hangar and climb into my PB2-A pursuit ship while a senior pilot shows me my metal-bound oxygen tube. He shows me the wooden mouthpiece you hold between your teeth. He points out the oxygen pressure instrument that indicates the proper amount to use at different altitudes—and the knob that you turn to vary the amount coming through the tube. He shows me the location of the oxygen tanks behind my seat—and my gunner's similar equipment in the rear seat (in the PB's the gunners ride backward in the rear seat and protect the tail of the plane with a flexible machine gun mounted there). "Very simple," I tell myself—and it was! But we shall see.

I go back to the flight room and while the crew roll the ships out onto the line and warm up the engines the flight commander explains the mission.

"Today's exercises will have a dual purpose." He points to a wall map. "We are the friendly or defensive patrol squadron. Three other PB's, simulating bombers, will represent the enemy. They will try to get through us and attack Langley Field. They have already taken off. Their directions and changes of course and speed, like ours, will be directed by radioed instructions from UL2 (the 8th Pursuit Group's control tower). Our job is to intercept the enemy. We both fly at the same altitude—27,000 feet!

He continues, "For the benefit of the new pilots—it is not easy to stay in formation at that altitude unless you are used to it. In thin air your controls will react sluggishly. Your motor may run rough or cut out altogether. If this happens, lose altitude until the warm air down lower starts it again. If you can't find the formation then, return to Langley and land—and don't forget to control your Prestone temperature with your shutters (the PB's are Prestone-cooled). We take off in 10 minutes in a nine-ship formation. That's all."

We start to walk away.

"Oh, and another thing," he lowers his voice significantly, "It's on flights like these that we tell the men from the boys and whether or not they can take it."

This is some of the extra equipment a high-flying pilot must take with him.

"Duck soup," I say to myself while walking out to No. 15 and slipping on my 'chute. I climb in, fasten my safety belt, run my engine up, turn my radio on, and plug in my earphones. I test my oxygen equipment and it functions perfectly. I check over my list, see that is O.K. and call my gunner in the rear seat on the interphone.

"My list is checked. All O.K.'s"

"All right, sir. Oxygen O.K.", he replies.

I turn my radio switch to "transmit" and wait for my flight commander to call me. I don't wait long.

"PW7 to the flight. Check list by number," comes over the radio.

My position in the formation is Five. Two, Three, and Four check in. I press the button on the throttle.

"Five," I say. (We wear throat microphones.)

The others check in. This checking in actually takes about 10 seconds and tells the flight commander that you are ready to fly. While the mechanics remove the chocks from the wheels, he calls the Langley control tower.

"PW7 to Langley Control. Answer."

"Langley Control back to PW7. Go ahead."

"Takeoff instructions. Nine PB's. Interception problem."

"Follow the B-17 off runway No. 5. Wind southwest 16."

"Received O.K. PW7 off."

"Langley Control off."

We taxi down the ramp and take off in three-ship V's. Once in the air I roll my wheels up (49 turns by hand crank), change propeller pitch, turn my gasoline switch to the left wing tank, and close my sliding canopy. UL2, the pursuit control tower, calls the flight

(*Continued on page* 83)

In Case of

An important factor in the next war will be America's network of airlines and their personnel.

UP to his on-the-wall vestibule telephone steps an overalled farmer. Briskly he winds the bell-handle that summons the operator; breathlessly he gives his message.

"I heard 'em. 'Bout a dozen, seemed like. Flyin' plenty high, fast, and headin' West. Looked like big fellers."

That was Farmer Ben Adams speaking. He's any one of 10,000 farmers who might be included in the United States Army Air Corps' great civilian "warning network" in time of national emergency. Farmer Ben has just heard and seen a squadron of enemy warplanes over his farm in North Carolina. He has notified the nearest air base.

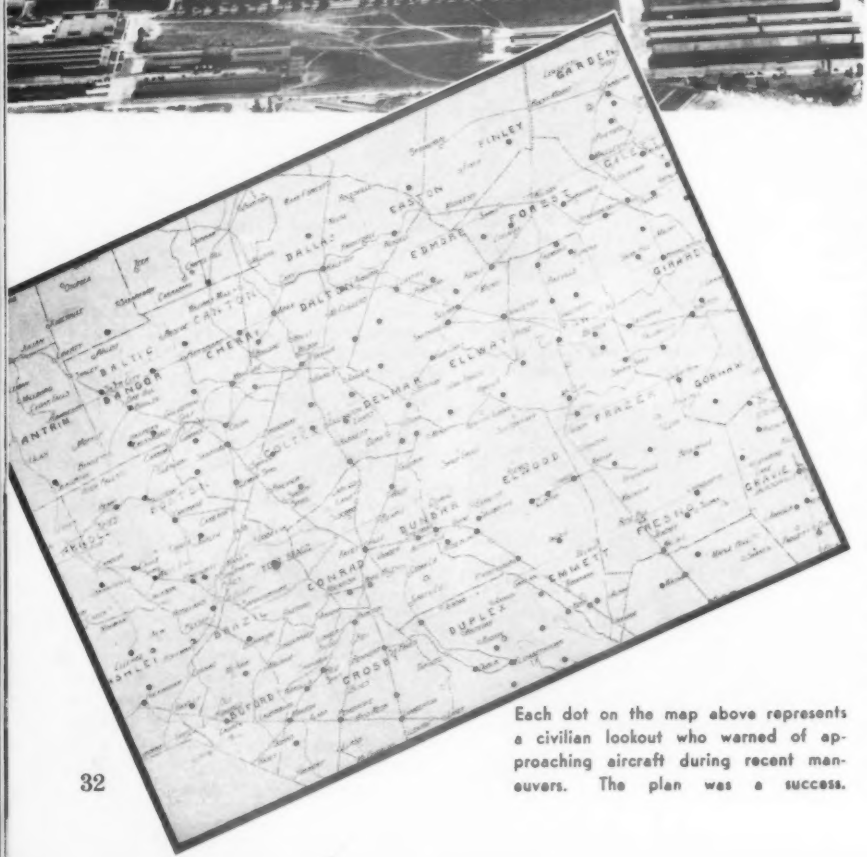
In a democracy, it is a citizen's right to help his government in peace times, his bounden duty in wartimes. But never has his opportunity been so great and grave as now. Thus about two months ago did the Air Corps enlist the citizenry in defense of their country—as all-seeing eyes of the sky forces.

Yet another civilian aid for Uncle Sam's fighting forces stands ready. Somewhat shoved aside in the heat of wargames, forgotten in the daily run of things, this aid is by far the most hopeful of all. It is the vast network of commercial airlines that enmesh the United States like a gigantic, invisible spider web. But a friendly spider web. Some 35,000 miles of transport lines link Bangor, Me., with San Diego, Cal., and Seattle, Wash., with Key West Fla. They link the Atlantic and the Pacific, the Canadian and the Mexican borders. No point in the 48 states lies more than hollerin' distance from a scheduled airline halt.

Consider this: 22,000 miles of this world of airways are lighted by 1,000,000-candlepower beacons that shine like lighthouse beams. Most of this network is tied indissolubly by radio beams that crackle 24 hours a day. Over 13,200 miles of this distance Department of Commerce and Department of Agriculture teletypes send weather news, dispatching information.

There are 2,229 (at last count) big and little airports. And there are 1,400 airline pilots—plus another 16,500 private flyers who at least know an aileron from an aerial.

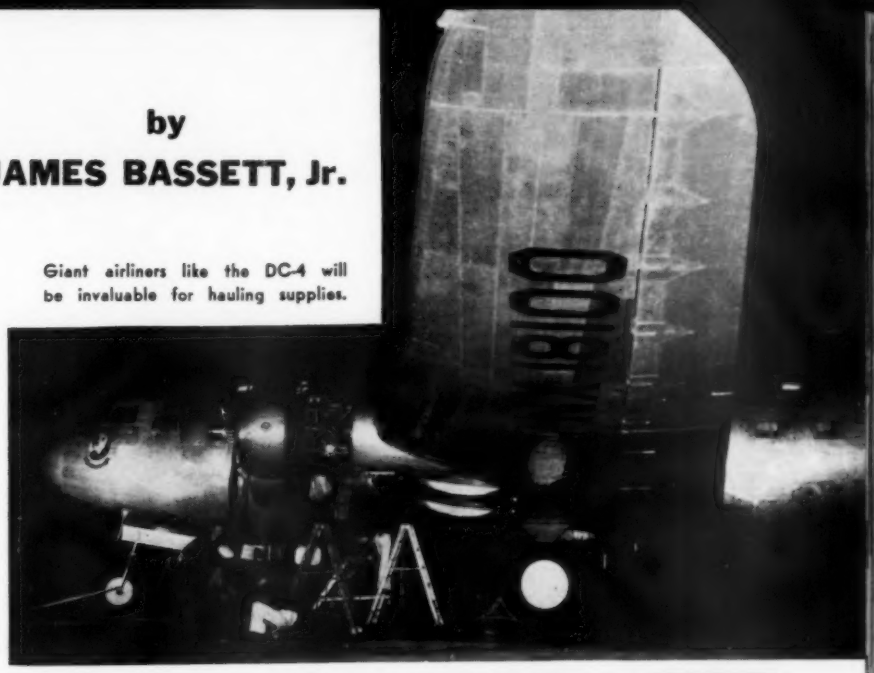
What does all this add up to? Just



Each dot on the map above represents a civilian lookout who warned of approaching aircraft during recent maneuvers. The plan was a success.

WAR!

by
JAMES BASSETT, Jr.



Giant airliners like the DC-4 will be invaluable for hauling supplies.

this: on that M-day (hour of mobilization for war) which may never come, the War Department will need civilian help. Already it has enrolled industry into a huge non-profit system, that will function the moment a crisis arrives.

But imagine that the United States were invaded. Today this may be impossible. Tomorrow it may not. A fast-striking, powerful enemy armed with undersea craft, multi-engined bombers and a strong navy might accomplish the miracle. Experts say this could happen: choosing the fateful moment when America was busily engaged in a Pacific struggle, a European syndicate of nations could pool its navies, arrive at striking distance of the coast, and launch fighting ships from aircraft carriers. Thus could Eastern industrial areas be reduced—or terrorized—sufficiently to permit the debarkation of a sizable land force.

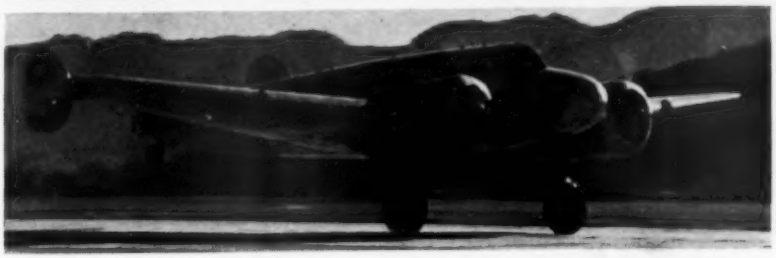
Or consider this: a high-up Air Corps bombardment officer told me that long range airplanes—of the sort we'll see within the next few years—might effect a base at Labrador, Greenland, Baja California, on the northern coast of South America, or the West Indies. Carrying incredible loads of explosives, they might "cover up" long enough to allow an invader to land troops nearby. That would mean that America's far-flung General Headquarters Air Force would be in line for some pretty quick hopping. That would mean, also, that the G.H.Q. personnel—the men who maintain these 2,000-odd fighting ships—must be transported from bases at March Field (Riverside, Cal.), Hamilton Field (San Rafael, Cal.), Barksdale Field (Shreveport, La.), or Selfridge Field (Mt. Clemens, Mich.), to the threatened zone.

But how? Over commercial airlines in commercial airliners.

Let's hark back momentarily to a summer day in 1936, to Morocco in Northern Africa. Generalissimo Francisco Franco, faced with the problem of moving an army across the Straits of Gibraltar without ships after the counter-mutiny of the seamen in the Spanish navy, turned to his air force. Thirty at a crack, jampacked like Castillian sardines in transports that had been stripped bare inside, he moved his troops. In three days, an army had been dropped from the skies on Spanish soil. That is a graphic illustration.

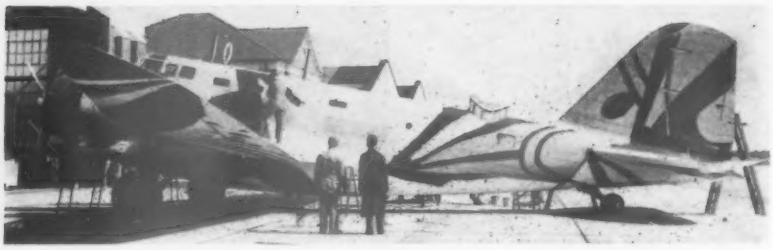
Last summer gave us another, much nearer home, during the 1938 G.H.Q. maneuvers. "Embattled New England" was coping with just such an "invasion" as I have outlined above. A hypothetical enemy had landed. Boston lay in danger of an air attack.

So, from California, Washington and war-points a fighting contingent of airmen moved. Some flew their own fleet Northrop A-17-A's, their Douglas B-18's, or Seversky pursuiters. But others were ferried eastward in what are known officially as C-22's. On the world's airlines, these are Douglas DC-2's—14-passenger transports. Like great metal shuttles, they hustled across the country, then retraced their aerial paces. Within a few days, the entire G.H.Q. complement of officers and enlisted men had been flown to New England. The day



Smaller transports like the Lockheed above would serve admirably for the moving of personnel around the country. They might also serve as high-speed ambulance planes.

If war came tomorrow, the Douglas DC-3's above would be ideal for the fast movement of officers or even needed troops. This vital airline network would depend wholly on the mechanic (right) and pilot.



The camouflaged B-18 is one of the bombers reported to be approaching by civilian observers during the recent East Coast "war". Camouflaged paint is easily washed off.

was "saved" for the Army Air Corps.

Ranking heads of the G.H.Q. expressed themselves as "greatly pleased" by this splendid showing, intimating that with added transport equipment they could haul—perhaps—whole infantry detachments, plenty of supplies, and certainly enough personnel to staff and service an army in action. That is true.

On America's major and minor airlines, twin-engined Douglas and Lockheed ships, large Stinsons, and the craft yet to come (big Boeings, bigger Douglases and medium-weight Lockheeds and Curtisses), offer a sizable fleet of peacetime transport material that could be mobilized overnight into sky ferries for the Army. Although carrying thousands of passengers per month, their cabins are still as lonesome as small-time bridge clubs. America's airlines could step up their flying at a moment's notice. Remember that more than 50,000,000 passenger miles will have been traversed this year.

Not one pilot need come from the regular Army Air Corps. The airlines' 1,400-odd experienced pilots—most of whom have been graduated from Army schools—could "carry the mail." Off-schedule, the cross-country speeds of these transports would be jumped in emergency times. Instead of blimping along safely and conservatively on about 50 percent of their available 2,500 h.p. the Douglases, for example, might be pressed to 75 percent or more. This would bring transcontinental flying time down to less than 15 hours. That's moving. But in crises, the best man moves fastest, surest—and wins.

Over the teletype from Los Angeles to Boston (still thinking of an imaginary invasion of New England) would flash the immediate, nation-wide warning:

"CLEAR AIRWAYS FOR GHQ OPERATIONS. CIVILIAN EQUIPMENT UNDER MILITARY COMMAND. ALL TRANSPORTS REPORT AT UNION AIR TERMINAL, LOS ANGELES, AT ONCE."

Then the Federal Airways Traffic Control system would get its great workout. Hitherto, at Newark, Chicago, Los Angeles and San Francisco, the busy men who direct in-and-out airline travel from metropolitan airports have handled a dozen, two dozen schedules daily without flaw. In tomorrow's emergency, with hundreds of big ships aiming at one field, the traffickers would find their system of buttons-on-a-map, interoffice telephones and ship-to-ground radio shot into high gear at a moment's notice. You don't guide 13-ton aircraft into airports one-a-minute without plenty of headwork.

But that, too, could be done. Along the 2,600-mile route across the Rockies, the great plains, the golden Midwest, the industrial East, these flying "40-and-8's" would pick up National Guardsmen, regular Army infantrymen and the eveready Reserves. Flying day and night, an Army with supplies would be plopped down in beleaguered New England within an incredibly short time. Proof that the air lines of the nation *can* and *do* work in double-harness came during the recent hurricane emergency on the Atlantic coast. American Airlines is the only route regularly serving Boston; to its aid, when trains and highways were washed out like drowned anthills, came TWA, United and Eastern. The public was treated to a spectacular demonstration of the potentialities of organized air transport.

(*Continued on page* 86)

Even flying boats like Pan American's clippers could be pressed into service. They could carry cargo and personnel between coastal or even inland cities with waterfronts.

Canadian Warplanes

FLIGHT tests have been completed successfully of the first Canadian-built Supermarine *Stranraer*, one of the several designs of British military aircraft being constructed in the Dominion. Eleven companies are actively engaged in construction of British aircraft in Canada; of these six assemble and "service" aero engines.

Builders of Supermarine *Stranraer* flying boats in Canada are Canadian Vickers Ltd. Ten of these machines are on order for Canadian military use. Commodious and fast, these twin-engined seaplanes equip Royal Air Force marine squadrons employed on general reconnaissance duties. Long range and capacity to carry an adequate quantity of bombs give these aircraft particularly satisfactory strategic qualities; their seaworthiness enables them to operate far from the home base.

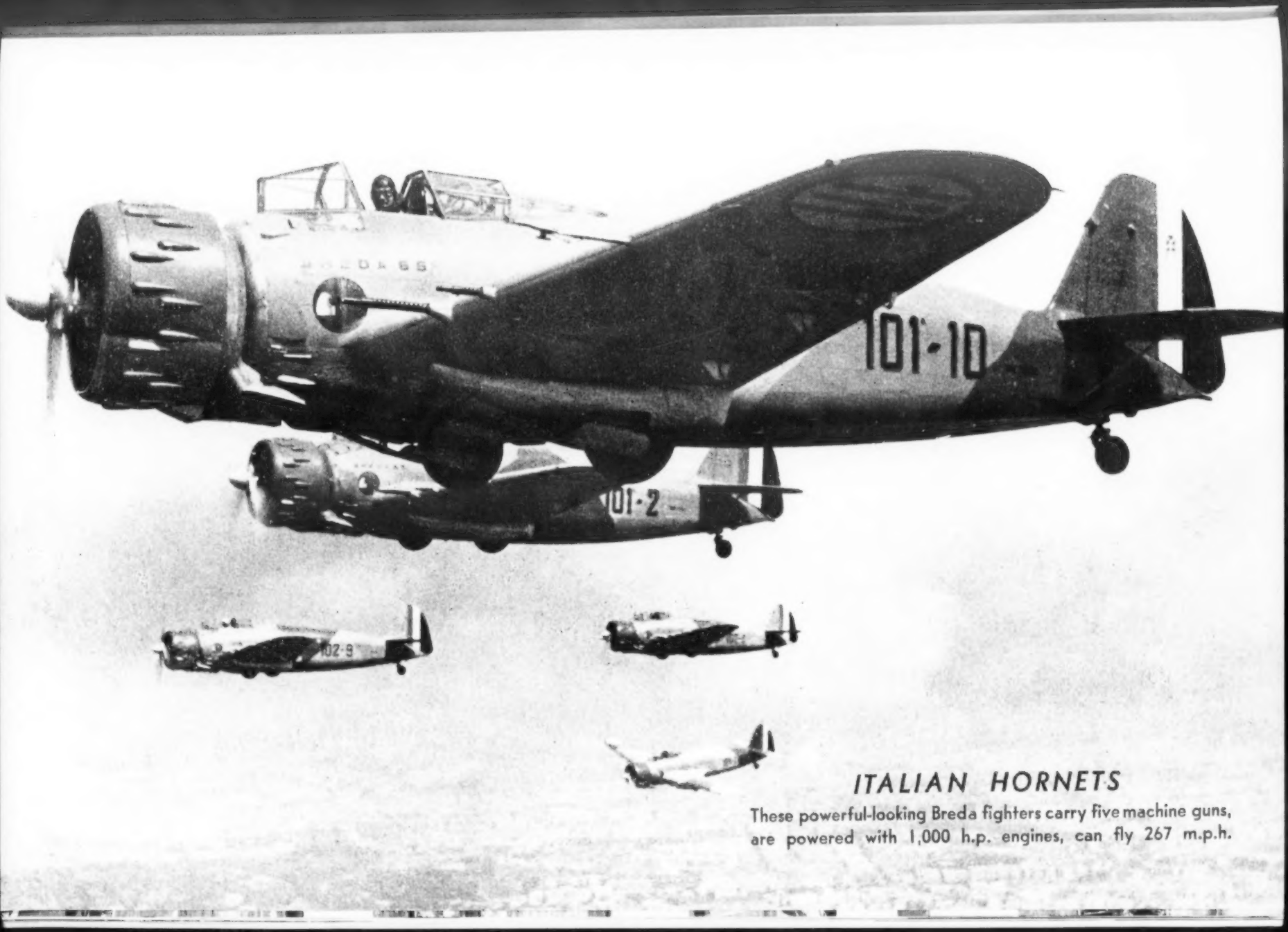
Stranraer-class flying-boats carry full equipment for navigational, reconnaissance, training and other duties. Accommodation is available for a crew of five, with suitable living and sleeping quarters. A collapsible dinghy, a derrick for changing engines if need be afloat, and a comprehensive range of active service equipment are able to be stowed away inside. A complete spare engine or a torpedo can be carried on the bottom center section.

Overload fuel tanks, carried under the bottom main planes, enable range to be considerably increased. Structure is all-metal with fabric covering to the superstructure. Power is provided by two Bristol *Pegasus X* nine-cylinder radial air-cooled engines mounted immediately below the upper center section. Gun stations provide protection during flight. Top speed of the *Stranraer* is 165 m.p.h. with full load in level flight: cruising range extends to 1,700 miles.

Some Baby!

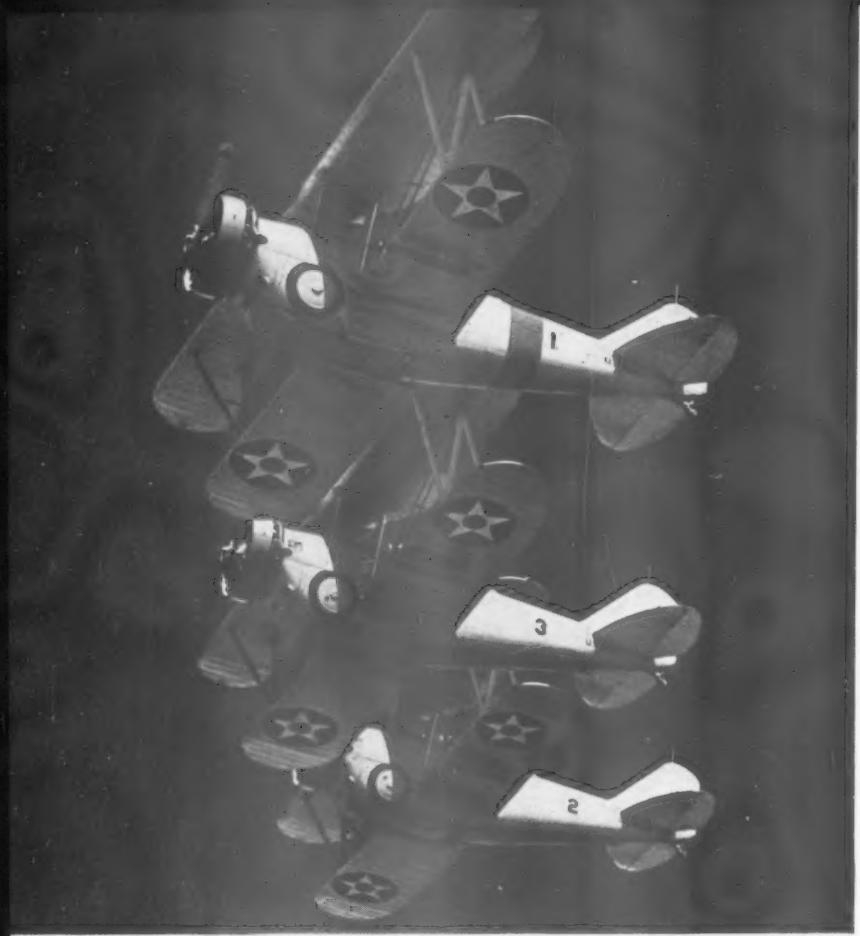
SMASHING all records for children who have done long distance flying on Empire routes, 18-months-old Master J. P. Willis will have flown nearly 15,000 miles by the time this appears in print. This infant traveler, whose home is Johannesburg, South Africa, flew to England with his mother, Mrs. H. C. Willis, last August. Mr. Willis, Director of the Aero-Survey Development Co., Ltd., in Johannesburg, followed his wife and child to England in September. The three of them flew back together.

Special provision for the child's food for his five-day air journey was made. This included porridge, a plentiful supply of fresh milk, lightly boiled or scrambled eggs, brown bread fried in bacon fat, lean beef, mutton or veal, steamed fish, boiled vegetables with plenty of greens, hot milk puddings, bread and butter, orange juice and a plentiful supply of fresh fruit.



ITALIAN HORNETS

These powerful-looking Breda fighters carry five machine guns, are powered with 1,000 h.p. engines, can fly 267 m.p.h.



Uncle Sam's military pilots unquestionably are the finest, most thoroughly trained in the world. The above squadron is made up of TWA pilots also in the Naval reserve.

★

IT'S THE *Hell* THAT MAKES THEM *Safe*

by JAMAIS HESITE

This is an unusual article by a Naval airman who went through the mill. It's the toughest flying school in the world—but it's by far the safest.

IF you exist through the first ten hours of flight instruction without becoming a nervous wreck—by finding that your every thought, real or implied, is all wrong—you have crossed only the first flagstone toward your goal—Navy wings. You are torn between rage at being called all kinds of a dummy, and fear of being propped up before a firing squad for murdering an officer. You wonder how in heaven's name the President of the United States could have the indiscretion, the downright gall, to put in writing in a commission that this instructor is a gentleman. He must be one, yes sir. Look, it says so right on the paper.

However, you grind an eighth-inch of good enamel off your teeth and bear it for, somewhere down in your inside, peeping from around all the self-confidence, is that stinging wonder whether you can really fly. So you bear it—but no grin, by heavens.

Basically, the organized training at Pensacola is simple. The training of a successful student consists of progressing successively through five squadrons, each squadron part dual and part solo. Briefly, this is the plan: Squadron 1, primary seaplanes; Squadron 2, primary landplanes; Squadron 3, advanced landplanes; Squadron 4, big boats; Squadron 5, instrument flying and fleet-type landplanes.

Progress in each successive squadron is determined by periodical "checks"—actual flying examinations. Among these, there is always a solo check in each type of plane (except single-seaters, of course) and a final check after a given number of solo hours to determine whether you've progressed when on your own. If a student cannot pass a check he is dropped right there. However, unless he is dangerous he's usually given a chance to pass a check he has "busted". He must then pass *two* separate checks for the one he busted. Soft? There is no laxness or sympathy about checks, they must be conscientiously passed. Many lives have been saved by busting poor students out.

You find that instructing transposes the most lamb-like man into a badger-

ing demon when in the air. You hear, "I don't see why you don't keep that wing up. The other one is down. Is this a tight rope act? You have the dopeyest idea of a beach approach I've *ever* seen. My God, man, haven't you any sense at all?" The Gosport works only one way; you can't talk back. You dumbly shake your head. You feel so sorry for yourself that you swear that you'll never utter another harsh word to man or beast. You won't hesitate to say you'd never go through Pensacola twice.

Then—solo. Contrary to what you've always thought, solo doesn't mean wings—not for 300 hours of it. It might in some places but not in the U. S. Navy. It only means that you are safe so far. And alone up there, it's fly or else.

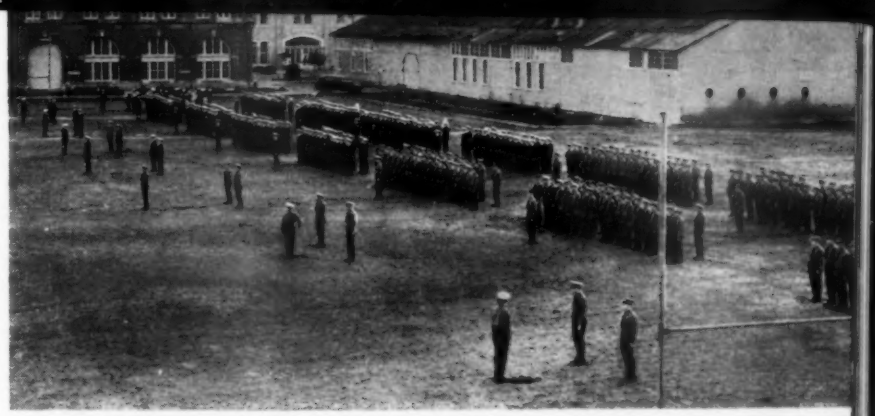
After solo practice in Squadron 1, you take your final check in trainer seaplanes somewhat in this manner: spin down two turns and remember *then* to shove forward on the stick, and to kick opposite rudder. Next, slap on 1,600 revs and hold her in a skidless, slipless flipper turn or two. Make the wind whenever a stray fancy to cut your motor off to make you land with a dead stick, strikes the check pilot. And lastly, you touch off that final check in Squadron 1 with a precision landing to within 100 feet of a beacon. You have completed one-fifth of the course.

Gee, boy, you must be pretty good now. You spin, flipper turn and land in a bay five miles wide and ten miles long with the greatest of ease.

What a revelation is Squadron 2. Landplanes. You there begin to learn what can be done with a plane. A new instructor takes you off for your first flight, the first of seven primary landplane instruction hops before solo. Oh well, you can take all that badgering now. Ummm, you never have a chance to prove it for all you hear now is cursing. The stick is all over the cockpit with you chasing after it, what with the air bumps over land and the instructor batting the stick all over the place. "I thought you were supposed to know how to fly. Great jumping offspring of dogs, can't you see that fighter climbing over your ear? Say, Butch, can you feel at all? Keep that ball in the center. Keep your head out of the cockpit; you aren't flying blind; are you? Quit gazing around at the scenery, watch what you are doing. Come in closer to the field. Watch your airspeed! Oh, who assigned you to me?"

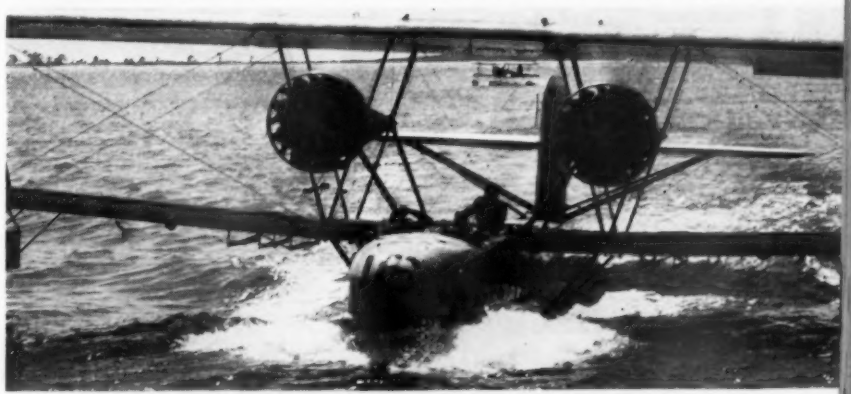
Solo. You look forward to it. Like quinine, it cures the fever.

After passing your solo check in Two, you come to the circle. On your intermediate check you must hit it four times out of six passes. The check goes off something like this: you glide down from 1,200 feet and hit it the first time. You miss the next. You sigh and think of home. The fourth time you are overshooting. Pull up your nose. Stall it in. Your airspeed is gone. Drop the nose. Get your tail down. It's going on. Kerplam! You're in.



Naval airmen must be efficient military men on the ground as well as capable flyers in the air. Above are embryo Navy aces lined up for inspection at Pensacola, Fla.

Squadron Two—landplanes—is a revelation. Here you learn what really can be done with an airplane. Above, an instructor describes maneuvers before a flight.



"Big boats" are an important part of the Naval pilot's training at Pensacola. Below are landplane trainers at Pensacola. The ships are rugged Navy-built N3N's.

The Naval aviator gets a highly diversified training, both in the air and on the ground. Above are Navy fledglings at Pensacola practicing on the pistol range.

Shaking a bit, you make another shot. Down you glide, your motor putt-putt-putting. Your flying wires humming. You are determined to do it perfectly this time. Watch out, you are undershooting. Dive it. Dive down close to the ground and skim along like a bat out of hell. Ease back on the stick. Don't balloon. She's slowing down. Will you ever reach that circle? Maybe, ma-aybe, ma-a-aybe. You find yourself pulling up on the stick as if you were lifting her up and putting her in. With a final flip, jerk the stick back the last inch and balloon it for a squash landing that rattles your teeth.

Three in. One more, one more, one more. Down you come from 1,200 feet. You're in the groove, glide on down. You're undershooting. Nose her down. You're overshooting. Pull her up. No, you're undershooting. No. Yes. Oh well, you close your eyes, think about roses; land; give her the gun. Pull up your goggles from around your neck where they slammed during that last landing. Fly around the field to pick up your instructor (who has been dodging about on the side of the circle) and wait for him to tell you that you hit it right on the head last time.

Stunts. My poor stomach. "Why do I have to feel this way?" The first hour of instruction seems interminable.

Loop. "You try one," the instructor says.

Loop. "O.K."

Wing-over to the right. "You try one."

Wing-over. "O.K. The other way now."

Wing-over. "O.K. Back and forth."

Back and forth. "Ummm."

Your mouth is beginning to feel a little on the sour side.

Immellman. Voom. "You try one."

Voom. "Ahh-h."

Snap roll. "You try one."

Sna-ap roll. You wonder where the stick is. "Not that way. Over again." He yells.

Sna-a-ap roll. "Over again. You're giving it right rudder but left stick. What in blank are you trying to do? Do you feel all right?" You nod your head for you know he can't hear your groaning.

Summoning all you've got, you kick something and pull something else at the same time. And so, around she goes. Well, anyhow, when you come down you know where the ground is. You bump your knee on it every time you stumble over those paint marks on the taxiway.

Stunting is all right but being stunted is something else. Yet after you have practiced alone for 12 hours, you almost begin enjoying stunts.

Formation flying. Oh well, you can't live all the time. Here is your ultimate test in nerve recovery, judgment, and speed control. You fly along at about 80 knots (92 m.p.h.). There is only 50 feet—head to head—between the leader and you. He bears 45° on your bow. The leader signals to change from "V" to echelon (that is, for the two wing planes to line up one behind the other on the 45° line, both on the same side of the leader). This change involves a cross-over. You answer his signal. He wobbles his ailerons. You give it full gun, kick right rudder, ease back on the stick a hair and skid over the other wingman's head with about five feet between your whirling propeller and his whirling head.

Suddenly you realize you are skidding over too fast. Kick opposite rudder. You bob in, shaving his wing with yours. Cut the gun. You're dropping back. Full gun. Whoa, too much, you're overrunning. Cut the gun. Not enough. These things don't have brakes, you know! Fishtail it. Slowly, so slowly, you drop back. By this time your nerves are jumping around and the back of the seat is bent in. Having dropped back again, you cautiously close the distance to the required 50 feet, and pray the leader doesn't execute any other maneuvers soon. Your nerve recovery period is the length of time it takes you to forget that cross-over. If you progressively shorten your nerve recovery period to practically no time flat during your course, you'll be a Naval Aviator. Thank God for your short memory.

Next, you have small, strange field approaches. Your instructor picks out some farmer's hen lot and tells you to pretend a storm is coming—and you just smile because you know it is—and to land in that lot.

Circle the lot, look it over, circle out farther the second time, cut your airspeed down to two knots above stalling speed, limp in over the trees, pick up each wing as it drops from under you. With a gulp, cut the gun on top of the last tree, brush it with your tail, haul back on the stick and pray the landing gear is

The picture below was made by a Warner Brothers cameraman during the filming of a new aviation picture, "Wings of the Navy". Note special ramps for launching ships.

sturdy. Whoom! You land. You always have said, anyhow, that flyers were closer to heaven than most folks. Jam on the gun before the plane stops rolling —and before the farmer comes out—and get out of there.

Cross-country. It's your first trip away from the 16 fields of Pensacola. All you have to do is to fly, say North 45° West by your compass for 30 minutes. Then look down, and there is Atmore. It's just 40 miles. But where in the South are you? Ah, there's a sign on a roof. My, this place looks bigger than I thought Atmore was. I didn't know Atmore was on a bay. Good heavens, Mobile!

Two months' restriction and four week-end watches for that one. Can the Commandant look mean? The panelling on the walls of his office is all warped and buckled from squirming under his stare.

Here it comes—your final check in Squadron 2. If you pass, bid goodbye to landplane trainers forever. The check includes everything you have been taught in Two. Small fields, emergency landings, turns on pylons, wing-overs, precision spins. Strange field power approaches. Circle shots, with slips and fishtails. At the end, if you are aided by your good old short nerve recovery period, it's "Climb up into the front seat, son."

Uncertainly, you crawl into the front seat. The check pilot gets into the rear one. "Where the hell are you, now?" you wonder. There's nothing in front of you to guide on. The check pilot impatiently yells, "Well, what are you waiting for?" Lord, it's beginning all over again.

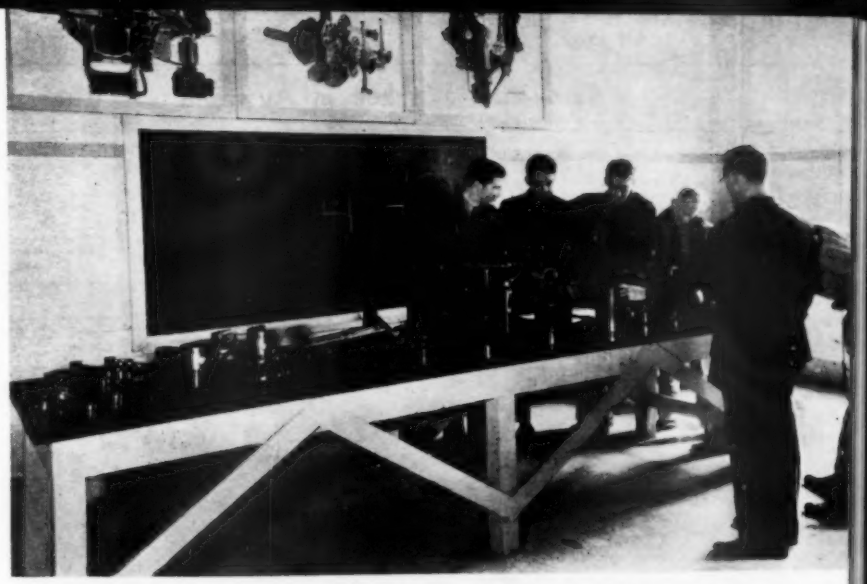
Mechanically and uncertainly you take off. How are you ever going to get this plane down? All the structure of the wings and fuselage, which you subconsciously flew by, are now behind you. Well, you've got to have a try at landing it, so why not now? And with that good old fighting man attitude that a dead man is just another piece of meat, down you go for it. . .

It's all over now: you got it down, although unorthodoxly. And so reward —front seat solo. Some mech is going to take the rap. It's customary to take along a mech in the rear seat as passenger on your first front seat solo hop as his weight helps you to get the tail down when landing. You are on the talking end of the Gosport this time. What did you vow about being nice to neighbors? Customarily, the mech wants to fly it a bit and it makes you feel mighty superior to be telling someone else how to fly. So you say, "Take it."

The mech tries. You yell without conscious effort or appreciable hesitation, "Raise that wing. You're skidding. Can't you feel? Were you drunk last night? My God, you're fresh out of airspeed. Where do you think you are? Don't sit there fat, dumb and happy. *Do something!*"

Oh well, resolutions. . .

The course is practically a cinch now.



Becoming a Naval aviator is not all the adventure it might seem. There are just as many pitfalls in ground school training for the prospective pilot to overcome.

No more trainers. You will now learn to fly every type of fleet type airplane. You have remaining before you about six months of experience getting in all the operations you will later function in when you join the Fleet a full-fledged Naval Aviator—after receiving your wings. Of course, you wonder candidly why they don't give you yours now instead of waiting until you finish Squadron 5. Just some more Navy inefficiency. It's at this phase that you taste for the first time the full mellowness of independent judgment. You feel fairly secure in your progress. And you'll probably buy a car.

Steaming on, you learn to shoot from the rear cockpit of a scouting plane at targets towed by planes. Also, in Squadron 3, you learn not to kill yourself and your mates in nine-plane formation operations. Oh, yes—and learn to navigate at least to the point of getting home.

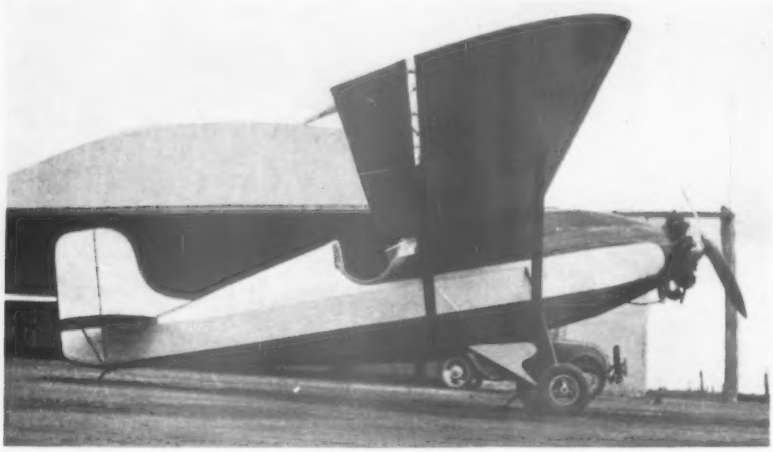
In Squadron 4, you launch a few torpedoes from torpedo planes. You drop heavy bombs from the flying boats. And you are a bit amazed that you aren't excited about flying them as big as they come. Also, you are shot off the catapult five times. Planes are all alike, you come to believe. The only difference between them is that with big planes you must not get into trouble at all, whereas with the small ones you can get into trouble and pull yourself out if you are quick enough.

Then in Squadron 5. Instrument flying. Fighters. A thousand leaping horses tied to a tiny plane. Dive bombing. Advanced stunts—rolls on top of loops, double snap rolls, slow rolls. Night formation flying. The immense dangers of night flying are largely re-

(*Continued on page* 86)

To know his airplane as well as humanly possible, the Navy airmen must be thoroughly familiar with its every inner detail. Below, Naval aviation students work on a wing.

'Home-Built' Yankee in Australia

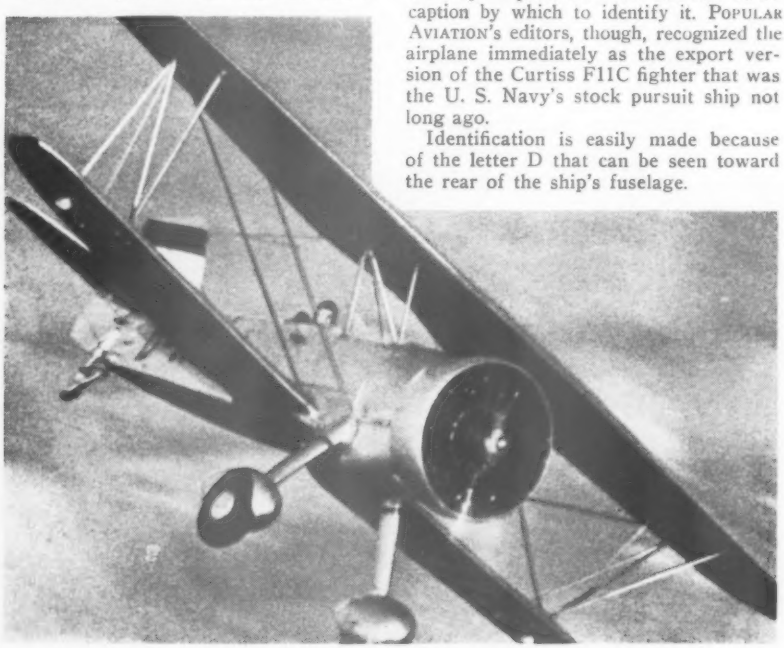


HERE is proof that POPULAR AVIATION really gets around. The airplane above is the well-known Corben *Super Ace*, an American home-built design. The other day J. R. Coomber of Narromine, Australia, startled us with the two photographs of his ship which, he writes, "I constructed this plane myself, plans for same having originated from your magazine". The Australian Board of Civil Aviation is considering a Certificate of Airworthiness for the ship. Mr. Coomber also writes that his Corben has a cruising speed of 90 m.p.h., landing speed 35. The engine is a 50 h.p. Salmson.

Were We Surprised!

THE airplane below is an American Curtiss fighter—with German markings! The photograph was submitted by a European picture service but carried no caption by which to identify it. POPULAR AVIATION's editors, though, recognized the airplane immediately as the export version of the Curtiss F11C fighter that was the U. S. Navy's stock pursuit ship not long ago.

Identification is easily made because of the letter D that can be seen toward the rear of the ship's fuselage.



British Record Flight

THE mobility of air power, and the length of the striking arm at its command, have been demonstrated as never before by the three British Royal Air Force bombers which have raised the world nonstop distance record to a new and astonishing figure. Ascending from Ismailia, Egypt, three days ago, the airplanes alighted at Darwin, Australia, yesterday. Two of them had flown nonstop from Egypt, covering a distance by "great circle"—the shortest possible distance between any two points on the surface of the earth—of 7,162 miles and, by the route actually followed, of not less than 7,350 miles. The third machine, with 60 gallons of fuel remaining in the tanks for the crossing of the Timor Sea and landfall in Australia, descended at Koepang and was refueled before completing the journey.

All three airplanes had easily surpassed the existing distance record, credited to Russia for a flight of 6,306 miles from Moscow to California by way of the polar regions. The British craft, which halted at Koepang, had flown non-stop 6,600 miles; its two companions went on to smash the record by no less than 856 miles. From start to finish the flight was a triumph of organization. Using elaborate blind-flying instruments when in cloud and by night, steering a course by observations of the stars, and aided by automatic pilots, the nine men who comprise the crews of the three aircraft maintained a well-nigh perfect course over sea, desert and jungle. Over the Netherlands East Indies they ran into violent storms and head winds which at times reduced speed made good over the ground to around 110 m.p.h. Throughout the journey their radio apparatus kept them in touch with each other and with ground stations which flashed back news of their progress to Air Ministry headquarters in London.

How Come?

THERE'S quite a question going around the Army Air Corps these days. It concerns the gigantic Boeing XB-15 bomber. The incident that brought the problem up was the recent hurricane that swept up the Atlantic coast, destroying life and property. The giant bomber was at its base, Langley Field, at the time of the storm. When the storm warning reached that Army Air base, ground personnel frantically pushed the big Boeing into a hangar. The problem, though, is that the hangar is only 110 feet wide, while the ship's wingspread is 150 feet. Though this is somewhat of a poser, the fact remains that the feat actually was accomplished. Incidentally, it was the first time the XB-15 had ever been put in a hangar; it normally is staked down outdoors.

by GEORGE R. REISS

Here's a fellow who made the grade in aviation by sheer boot-strap pulling. The man is Jerry J. O'Donovan and the story is one that might well give a few of us some pointers. We give you an awfully tough Irishman.

'Horatio Alger' O'Donovan

THIS, please be advised, is a "Horatio Alger" story of the airlines; you know, from rags to riches via the steady uphill path of constant application of honest endeavor, burning of much midnight oil, and strict abstinence from the ways of all flesh.

It's the story of Jerry J. O'Donovan, "Horatio Alger" O'Donovan, as he is flippantly known in the airline ticket offices and stations and pilots' quarters from Norfolk to Saulte Ste. Marie, from Buffalo to Milwaukee.

Here he serves as the shining example to the eager and ambitious newcomers into the game of air transportation, a sort of a constant and ever-bright reminder that there is still plenty of room at the top for he who is ambitious for the top.

"Horatio Alger" O'Donovan, he is called, because he was a poor, bewildered immigrant boy—penniless and friendless—who climbed the ladder rung by rung from a place as the least important employe of the shortest and least important airline to a place at the top of the fifth largest airline.

O'Donovan, only 32, rates as the nation's youngest important airline executive. Technically, he is vice president in charge of traffic of Pennsylvania-Central Airlines; but it is whispered freely he's the fellow who is greatly responsible for Pennsylvania-Central's spectacular success.

And a success it is. For Pennsylvania-Central is the envy of some of the big lines. This by virtue of its remarkable record of being probably the only big one "breaking even" financially, of hauling the biggest loads, of being one of the most rapidly growing—and its clean safety slate.

Using older and less commodious planes, it sells a higher percentage of available passenger seats than virtually any other line—75 to 90 percent—thanks to O'Donovan's resourceful sales force. It has virtually doubled its route mile within the last year, and it ranges fifth in size after American, United, TWA and Eastern.

Quite a success for a young fellow, only 32, who only 14 years before had landed in the United States as a fugitive and a stowaway, penniless, friendless, ignorant of American ways and American customs.

"Horatio Alger" O'Donovan is a skinny, nervous little fellow with a bashful boyish air about him which causes folks to underrate him—at first. But he's a chap with remarkable energy, flitting here and there with lightning-like speed, cleaving ruthlessly through the red tape and with a remarkable capacity for cleaning up the details.

O'Donovan's past reads like fiction. Born in Cork, Ireland, April 15, 1906, he was educated at St. Mary's Academy and Queen's College, Dublin, Ireland. In his spare time, he acquired his best tools in the trade of aviation. He learned to play golf expertly—and it paid later.

Ireland, in those days after the World War, was torn wide open with internal strife. O'Donovan, a lad of 15, quit school and joined the Fianna, a junior auxiliary of the Irish Republican Army. Later he joined the "flying column," a crack troop of the Republican Army, and fought all over Ireland, being wounded three times.

Finally, he was captured by the British and held for court martial. But he escaped from jail, was smuggled aboard a steamer and stowed away, finally landing in New York without friends or money.

Naturally, the 18-year-old lad turned to golf, becoming a "pro" at Greensburg, Pennsylvania. While O'Donovan was playing in a tournament at St. Louis,

(*Continued on page* 80)

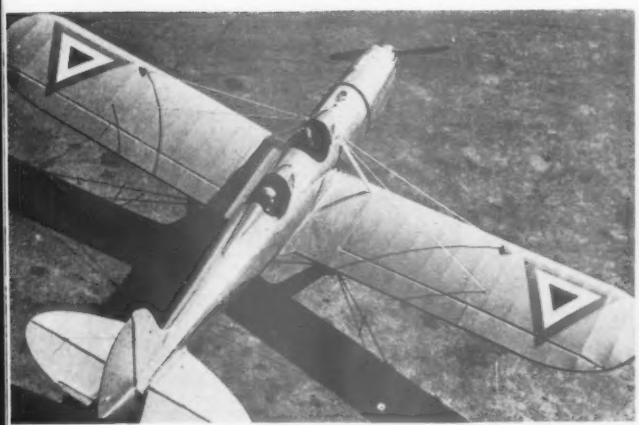
Pennsylvania-Central's Boeing 247D's are kept full and flying day after day due to the determined efforts of Jerry O'Donovan. Above, mechanics are starting a PCA ship.

MORE LOOK-ALIKES

Here are some more "duplicates" like those shown last month. Do our readers have others?

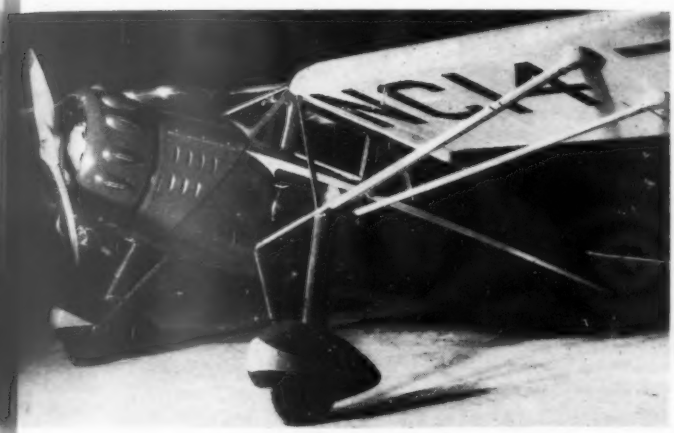
PERHAPS some of the similar-type airplanes shown here and in last month's issue are coincidences. It would seem to the average person, though, that some manufacturers admittedly make the most of a good idea and adopt whatever design happens to strike them as worth-while. Last month's series of Douglas look-alikes—far from being all there actually are—should prove that. Perhaps not so strikingly similar as the Douglases, but nonetheless definite look-alikes' are the American and foreign airplanes on this and the opposite page. The Japanese, who have popularly been known as the world's greatest imitators for many years, are best represented this month, especially with their likeness of the American Boeing P-26 at the bottom of the opposite page. Also noteworthy is the detailed similarity between the American Vought and the Japanese Nakajima directly below. So far as POPULAR AVIATION is concerned at present, no more look-alikes are scheduled for future issues. However, readers are urged to point out any such similarities we have not covered and, if possible, submit pictures.

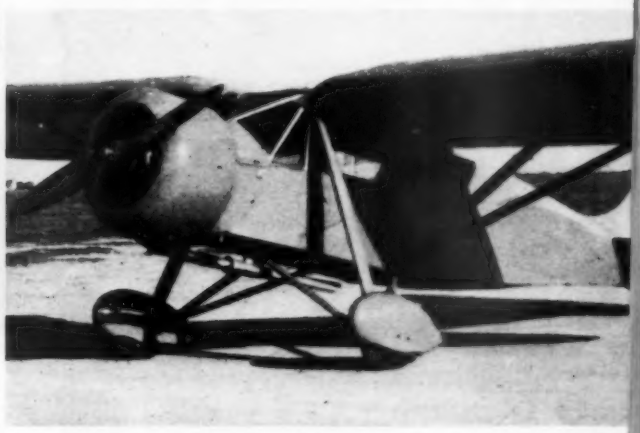
The airplane at the left is the American Vought 03U, better known as the "Corsair." This was the standard shipboard observation plane in the Navy several years ago. The ship at the right is Japanese. It is the Nakajima Navy Type 90-11 and is strikingly similar to the older American Vought. Notice that the flotation gear (the long bumps forward on the fuselage) on the Japanese ship is exactly like the American's.



The American airplane on the left is a Ryan ST for export to Mexico. Its counterpart on the right is a Swedish Sparmann S-1. Although these two airplanes differ a bit in their construction, their basic designs definitely qualify them as "look-alikes." The American ship is powered with a 150 h.p. Menasco; the Swedish ship has a 130 h.p. Gypsy. Both ships' performances are comparatively the same.

Greatest reason for the general similarity between the American Bellanca (left) and the Canadian Noorduyn probably is the fact that Robert Noorduyn once worked for Bellanca. Both designs, however, are very popular among Canadian pilots who need rugged heavy-duty aircraft for their widely varied work. The unusual-looking landing gear on the Noorduyn is intended to accommodate wheels, floats, as well as skis.





This look-alike shows an American Fairchild as compared to an Austrian Hopfner (right). The Austrian design follows the older American ship closely, even to the wooden fixed-pitch propeller. It is powered with a 150 h.p. Siemens engine; the Fairchild "24" uses a 145 h.p. Warner engine. Both ships are three-place. Their striking similarity even is borne out in their performances: both cruise around 120 m.p.h.

The ship on the left is the old American Boeing P-26 fighter now fast becoming obsolete in the Army Air Corps. The airplane at right is the Japanese Nakajima AN-1, a surprising duplicate of the American ship. The Japanese ship copies the American design, even to the duplication of flying and landing wires on wing and undercarriage. "Major" difference from the Boeing is the Nakajima's fuller cowl and cockpit hatch.

Love Birds

by HAMILTON THORNQUIST

Robert and Nancy Love are the ideal couple, especially from an aeronautical standpoint. Together, they have done much for aviation.

Bob and Nancy Love.

THERE is a prevalent tendency among airmen to adopt the raised-eyebrow attitude when the subject of women pilots comes before the board at a session of hangar flyers or over the teapots at Joe's Place around the corner. To be sure, the triumphs of the ladies over some of the best masculine pilots in the country have given the girls a prime boost in flying reputation, but withal the opinion of your gentleman of the air when sounded out on the matter will be, "Yes, she's pretty good for a woman."

It's lucky Bob Love doesn't have that kink in his thinking, because his wife is ranked among the first 20 women pilots in the United States. She's been flying since she was 16, and she was a transport pilot two years before she was old enough to vote Republican.

To the general public, Bob Love is Robert M. Love, president of Inter City Airlines, the largest commercial charter, repair, sales, and student instruction airbase on the Municipal Airport at Boston (need we add New England).

Nancy Love really doesn't have much to do with the business, but when she isn't at the National Air Races in Cleveland or on an air-marking tour for the Bureau of Air Commerce (now Civil Aeronautics Authority) or demonstrating a Bureau safety-plane in Michigan or flying to Washington for a conference of aviation authorities — you probably will find her at Inter City's hangar in East Boston talking aviation with Bob and his friends.

Bob and Nancy Love get more fun out of flying than the Marx brothers would have in the White House in an election year. Aviation is a vocation and an avocation to both of them. They even made their wedding trip in an airplane.

You can see the vocational side of the picture if you wander down to the East Boston airport on any fine Sunday afternoon—winter or summer. That field is the finest on the east coast now, and as you walk out from the administration building you can see 40 huge Douglases taking off and landing each day on the New York-Boston run alone. If you turn your eyes from the transports, and look down the concrete ramp towards the sea your glance will be caught by a nearby hangar on which is painted Inter City Airlines in letters that could not be visible more than three miles away.

On the line before the hangar there may be 20 planes, from *Cubs* and Aeroncas to Fairchilds, Stinsons and an *Electra*, and if you are lucky you may find Alfred Gwynne Vanderbilt's Douglas or Henry Morgan's Grumman amphibian waiting for their owners to return from the horse races or from a meeting of the Harvard Board of Overseers. But that is the end of the story; the beginning was not the same.

It all started in 1929, when Bob Love was at Princeton. One day he looked at an OX American Eagle parked in a field behind a garage. That put the goose in the oven. So he learned to fly in one of the worst barnstorming operations he's ever seen since. He shuts his eyes slowly when he thinks of it.

He'd never been within five feet of an airplane before he took his first 45 minutes of instruction, but soon he'd bought a Le Blond Arrow Sport. Then he transferred to the Massachusetts Institute of Technology, but he found he wasn't going to be able to get into the aeronautical engineering department, so he walked down to the airport and went to work steadily selling planes. By that time he owned a Stearman, and could fly it on floats as well as on wheels.

There was still a remnant of the old-time casualness about the aviation industry at that time, but Bob had turned over on the serious side, so in the spring of 1932 he joined up with a group of pilots who used to run Ford tri-motors between New York, Hartford, Springfield, Boston and Albany. With Boston backing, he founded his present corporation in April.

The company purchased some Travel Air 6000's and started a schedule of three round-trips a day between Boston and Springfield, the highest volume run of any operated by the former pilots' group. "If I do say so, it was one of the best regulated small airlines in the United States at that time," Bob will tell you. When the ships had radio and sufficient instruments, the company received a letter of authority for interstate operations, and extended their run to Albany.

Then the trouble started. Prosperity was way around the corner, and the financial pilots were flying under the

There always is plenty of business for Bob's and Nancy's Inter City Airlines.

hood without instruments in zero-zero economic conditions. So Bob went to Washington to get a grip on the air mail contract between Boston and Albany. He saw senators, congressmen and everyone in town who he thought could help him. It looked like apple pie, because he'd begun to think politicians meant what they said all the time.

He got over that, though, when AM-20, which had been extended from Fort Worth to Cleveland to Albany and down to New York, was continuing to Boston, but—they gave the contract to American Airlines.

That left Love & Company with four Travel Air 6000's, a Stearman which Bob used to call the "Executive Ship" when he wanted to cheer himself up, and a pot of red ink that would overload a *Cub*—and nowhere to go. They couldn't run south because American Airlines had the route between Boston and New York. West to Albany was closed. You couldn't fly east without pulling a Corrigan. So they looked north, and thought they had found the answer. Think of all those people up there, and no airline to take them anywhere.

Bob went to see the Boston & Maine Railroad people. He enlarged the bee in their bonnet. They were definitely interested, and finally told him he could have the contract if he could cover the route for them at 30 cents a mile. Bob and his friends did some figuring—plenty, in fact. They got down to 33.5 cents, and couldn't bring it any lower without losing money.

Bob still remembers when he took those figures before the railroad board of directors. Now—at the age of 29 he thinks he must have been in knee pants, it seems so long ago. Boston's finest financiers were there. So was Amelia Earhart. He remembers the frowns of displeasure that spread when he mentioned 33.5 cents—and-the-railroad-to-keep-the-air-mail-proceeds. He remembers how Miss Earhart suggested 30 cents a mile, and a percentage of the air mail contract. And he learned a lesson when the railroad took the Earhart offer—because it hit the directors' figures right on the button. He still thinks he had the best proposition, though, because the railroad found it cheaper to buy out the Earhart group later on.

All that took a lot of time out of Bob's courting, but he still managed now and then to fly out to Vassar College where Nancy Harkness was studying and flying in her spare moments. Things were happening all the time, though, and the next business was a summer run to Cape Cod with a two-schedule-a-day operation between Hyannis, Falmouth and Boston.

The Cape route went pretty well, but there didn't seem to be a million dollars in it, so Bob started looking at problems nearer the home ground. Inter City had been paying Curtiss-Wright for service and hangar space and he thought the outfit was in a low-cost frame of mind. He made an offer for their entire plant, which had set the

Nancy Love was an important factor in the development of the Gwinn Aircar.

Tom Wheeler (left) welcomes as guests Mr. and Mrs. George Post and the Loves.

original stockholders back $250,000. He didn't pay much but he got it, and he found he was saddled with one of the finest white elephants east of the Charles River. It took a lot to change the color of that elephant, but the white shaded into gray and the gray got darker and now only a few white spots show through the solid black.

If you land at East Boston now you can leave your ship in one of Inter City's hangars that will house 20 to 30 ships. It is sprinklered, heated, fireproofed, and there are offices in the front section. There is another hangar for servicing, repairs and storage. Everything you need is there. You can learn to fly, buy a plane, bust it up, have it fixed, stored, serviced and sold without calling on anyone else.

In four years, Bob Love's company is doing four times the volume of business they did in the first year. They have 40 employees and five distinct departments. Number 1 comes under Flying Operations—a government-approved school; a complete charter service, a modern service for rentor pilots, and other specialized service. In the special division there is instruction, seaplane operations (Inter City has a ramp on the ocean front of Boston Harbor, at the end of the field), and aerial photography. Bradford Washburn of the Harvard Institute for Geographical Research, who also is a prominent explorer, has done a lot of aerial camera work in the company's planes, and the staff and students at M.I.T. use the ships in their scientific operations. The Harvard Flying Club is another customer.

On tap are twelve modern airplanes —Stinsons, Ranger-powered Fairchilds, a Ryan and, primary training, the reliable old Model 7 Fleets, maintained to modern specifications. Ships on floats are available in the warm months.

Then there is the airplane owners' service, which involves light servicing, gas and oil and other conveniences. Third is a sales organization, which distributes Stinson airplanes, Lycoming engines, Lycoming-Smith propellers and Fairchild and Aeronca airplanes in New England.

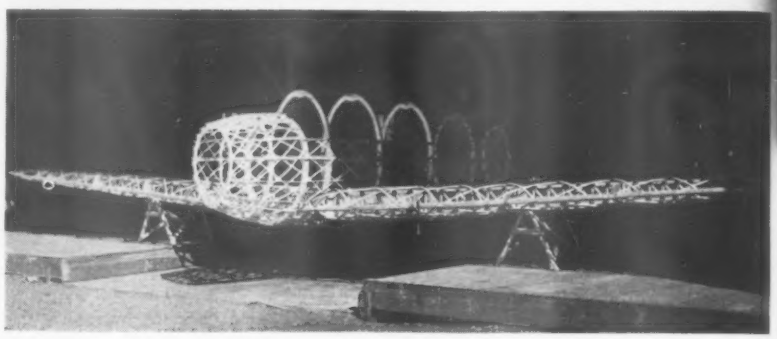
Next is a service and repair shop for airplanes and engines, including complete accessory services, such as propellers, instruments, magnetoes, carburetors, etc.

The last division—a comparatively recent addition—is a wholesale and retail store which has approximately 5,000 aviation parts and accessories or allied items. This is the department that continues to baffle Bob and his associates. He found they could buy an electric razor there, and one of the local C.A.A. inspectors found the staff was able to produce a set of silver butter knives when he'd forgotten his wife's birthday until the last minute.

All this points up to a theory that jumped into Bob Love's head right after he'd bought that Curtiss-Wright plant. Give people the best they can find, and

(*Continued on page 72*)

Geodetic Experiments



THE top photograph shows a geodetic airplane fuselage built by students of the Aero Industries Technical Institute at Los Angeles for experimental work. The fuselage is made up of spruce strips and will serve as a working model for an all-metal glider of the same type construction which Aero I.T.I. students will start in the near future.

Officials of that school are mistaken, however, in their belief that theirs is the first American attempt at this type of construction. The lower photograph, submitted to POPULAR AVIATION many months ago, is of a geodetic fuselage and wing designed and built by George Yates of Beaverton, Oregon, an outstanding "home builder".

Oooooops!

THE gentleman sitting in the front of the unusual-looking craft below seems a bit worried about the results he's getting with his flying-wing type lightplane. Leonard Bridgman, POPULAR AVIATION'S European correspondent who submitted the photograph, could only supply us with the daring aeronaut's last name: Espenlaub.

Mr. Espenlaub, we're told, has aspirations of producing a practical, easy-to-fly lightplane based on the flying-wing design. Mr. Espenlaub built the prototype you see through the dust and proceeded to put it through its paces. Something, it seems, went astray. Though he has had a good deal of experience with conventional lightplanes and gliders, Mr. Espenlaub was a little unused to his little pusher design. Anyway, he took the ship up on its test hop. So far as we're able to determine, everything went fine until the landing. Then Mr. Espenlaub's pusher engine must have pushed too hard.

ARE YOU A GOOD MIXER ?

There's more to flying an airplane than working stick and rudder. Pilots will do well to heed the pointers given here.

by ABBOTT MacDONALD

MY good friend, Peter DePilot (Johnny Q. Public's Flying cousin), was looking over my shoulder as this article's title was being typed. He immediately exhibited more than average interest in my pre-occupation and wanted to know if this was to be an authentic compilation of recipes for the home bartender or ten easy lessons in "How to Be Popular." "Pete," I said, "I'm glad you asked—but let me answer your question by asking you one. You've been flying for about 20 years; will you describe the various adjustments of the altitude mixture control?" Pete, who does most of his flying on week-ends, went into an overcast but soon came out in low pitch and

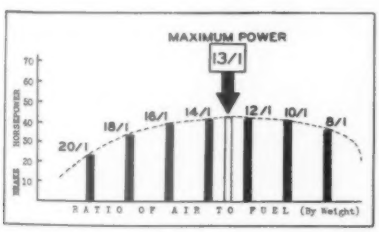


Figure 1

high blower, "Why uh—yes, of course —the mixture control—that's easy, Rich and Lean!" and he punctuated his gem of knowledge with a smoke ring.

Let's pause for a moment while we sneak a peak at Peter DePilot's log Yes, there it is; an entry on September 5th recording "forced landing acct. busted valve," followed by a more or less incriminating comment—"oil temperature running too high." Further kibitzing, with Pete's good-natured help, revealed that he was returning from a Labor Day week-end cross country. He ran into moderate head winds and, in an attempt at making better time, turned up a few more r.p.m.s—well, a little more than a *few*—and flew low "to keep out of the wind." Mixture control? Oh, he just "leaned 'er out a bit." Further details, while making pretty good newspaper copy, won't contribute anything more to the motive for this discourse. It might be concluded, however, that no other single thing causes more confusion in the mind of the average pilot than the proper operation of the altitude mixture control. Many a dollar is spent for maintenance resulting from the skimpy use of the mixture control in an effort to save a few nickels' worth of gas.

Before going any further, let's stop and consider the real function of the mixture control. If we were to measure the brake horsepower developed by a given small engine when various mixtures of fuel and air were supplied to it, we would find that the power of the engine varied according to the proportion of air and fuel somewhat as shown in Figure 1. An examination of this curve will reveal that the engine will deliver maximum power when the ratio of air to fuel (by *weight*) is about 13 to 1. But a cubic foot of air at sea level weighs more than the same volume of air sampled at any higher altitude. Thus, under standard atmospheric conditions, a cubic foot of air will weigh 076 lb. at sea level, while at 10,000 feet a cubic foot of air will weigh only .056 lb., or about 74 per cent of the sea level weight. A carburetor, however, is not capable of weighing out a given quantity of air for each pound of fuel consumed since it *inhales* air by the cubic foot (or any other convenient measure of volume). Consequently, the weight of air mixed with the fuel will *decrease* as the air density decreases, and the *power* of the engine will be similarly decreased in approximately the same percentage.

Even when near sea level the carburetor will not provide the exact correct mixture which will produce maximum power output from the engine. In order to allow for unpredictable va-

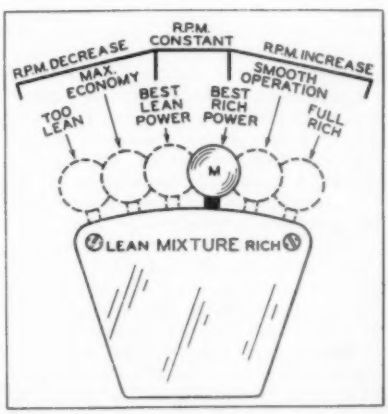


Figure 2

riations in the different kinds of fuel you might feed your engine, atmospheric conditions and other operating variables, the carburetor mechanism is adjusted at the factory to provide a slightly richer mixture than that which would result in best power. For ordinary short flights at low altitudes, such as we might make in practicing landings or hauling passengers on local sightseeing trips, this setting is entirely satisfactory without further adjustment. For flights of any duration, however, where it is desired to obtain better fuel economy, or when flying at altitudes above the critical altitude of your engine (if supercharged), the use of the mixture control is not only desirable, but advisable. *But*—and this is important—the mixture control must never be used without a full understanding of its effect upon the engine, and the general conditions under which your engine is operating with respect to

(1) Octane number of fuel employed.

(2) The altitude at which the engine is being operated.

(3) The crankshaft revolutions per minute.

(4) The manifold pressure (if it's that kind of an engine), and—

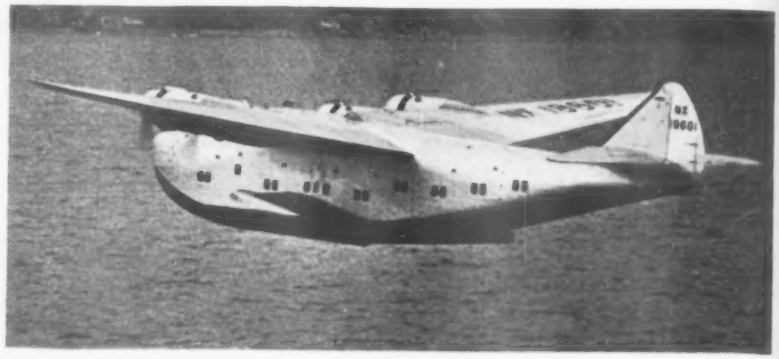
(5) The engine temperature (oil, cylinder head, etc.).

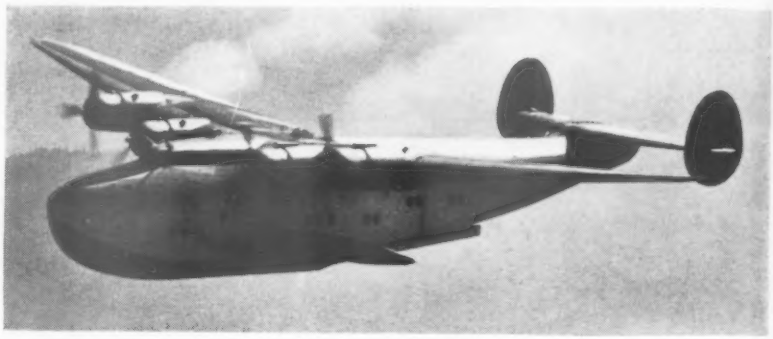
Right here is the place for brother Pete to whistle softly and mumble something about this stuff being "too technical," and conclude with something about having flown Jennies "years ago," at which time pilots apparently were more or less successful in staggering off the ground and back again with "nothing but a throttle and a stick." However, from our point of view it appears that times have changed considerably. The modern engines we fly today perform much differently than the engines we flew yesterday, last year, 10 years ago, or—and this is beyond my flying time—20 years ago. As performance has been painstakingly improved—bit by bit—the instruments, gadgets, and controls requiring a pilot's attention have increased more or less proportionately. Yet, what's new about th altitude mixture adjustment? Why all this sudden hubbub about a gadget we've been accustomed to using (properly or not) for lo, these many years? Well, it seems that the engines of yesteryear weren't quite as easily damaged by improper and ignorant use of the mixture control as modern engines. It is probable, therefore, that we simply have never learned to respect it and appreciate it and use it with the tender understanding it deserves. During the past ten years flying has been converted from an art to a science. It is therefore deserving of our study.

Peter DePilot has already, though somewhat dubiously, informed us that there are at least two adjustments of the mixture control; rich and lean. If we accept these settings as the *extreme* adjustments in the rich direction and the lean direction respectively, we can fill in the intervening space with four additional settings. We would then have the following adjustments (progressing

(*Continued on page 82*)

Same Ship, Three Tails





THE three views above are of the same airplane: the Boeing 314—Pan American Airways' new *Atlantic Clipper*. These photographs illustrate a mild but persistent controversy that seemed to hang on tenaciously from the very first appearance of the ship. On the appearance of the *Atlantic Clipper* for the first time (top photograph) those "versed" in aviation insisted with surprising unanimity that the tail surfaces were far too small in proportion to the rest of the airplane. Boeing's publicity department soon found it necessary to make some official statement regarding the original tail surfaces for, not long afterward, the company's engineers had to turn out another tail assembly "to get better control on the water." The second tail group is shown in the center picture.

As Boeing and Pan American test pilots worked the ship out, further difficulties with even the second tail assembly were experienced. The engineers went back to work again and finally decided to add the original tail area to their second, twin-ruddered assembly. The result is shown in the bottom photograph which shows the *Atlantic Clipper* as it is today. Most unusual angle to the entire project, though, is the widespread opinion of almost every aviation man with whom we came in contact that the originally-designed tail surfaces were far too small for the giant flying boat.

Meanwhile, as this is being written, Civil Aeronautics Authority officials are running tests on the *Clipper* prior to issuing its license. Once this license is granted, the ship will be formally delivered to Pan American Airways. Many rumors as to the first use that airline will put the new boat to are prevalent. It has been said variously that the ship will immediately be placed on the Pacific run, that it will go to the New York-Bermuda division for "shake-down" tests and that it will be prepared for transatlantic service.

THE Man UNDER THE Hood

THE greatest boom in private flying this country has ever seen—not excluding the days immediately after **Lindbergh's** flight—will be upon us soon as a result of the rearmament program . . . at least two members of the CAA, Army and Navy officers are sitting in with **President Roosevelt** in person, planning a program of training for 100,000 civil pilots, and 125,000 civilian mechanics.

The federal plans call for payment of a federal subsidy to all pilots who obtain a license, and a further bonus to those who keep up their flight training by spending hours in the air . . . the CAA probably will supervise with the Army and Navy furnishing some instructors and having a good deal to say about technique, etc. . . . furthermore the CAA is plotting to get several of the smallest manufacturers together to produce one small training type plane that can be sold cheaply . . . reviving **Gene Vidal's** old $700 airplane idea with a 1939 twist . . .

Remember our mentioning the Civil Air Guard scheme in England? . . . Something like that's going to be started here . . . All us poor gents who have to buy time, are going to have a heaven on earth . . . And thousands of us who haven't been able to buy any time are going to have an opportunity to learn to fly . . . nothing's settled yet, and Congress is going to have its say in any program that the president may draft, but the current definitely is turning our way at last.

* * *

Alex de Seversky has gone to Europe to sell his P-35 fighters to England and France . . . he's after some of the business that **Curtiss** snapped up when the French and British commissions were here . . . and out at Farmingdale his plant is just about idle . . . in his "secret" shop he has, however, two new airplanes that he's entering in the Air Corps competition for new pursuiters that will be held this spring . . . one is a flush-riveted ship with the 1,600 h.p. ***Twin Row Cyclone*** we told you about a month or so ago . . . the other is a smaller ship with wheels that retract flush with the wing . . . both supposed to be in the 375 m.p.h. class.

Understand that **Curtiss** expects to get the contract, however, with their latest version of the P-40, which has the **Allison** V-12 Prestone-cooled engine giving 2,000 h.p. for take-off . . . this little hell-diver is supposed to do over 400 m.p.h. . . It was the ship that was shown to **President Roosevelt** recently when, with a retinue of Congressmen, he went out to Bolling Field for a military demonstration all his own . . .

* * *

We hear that the **Douglas** tricycle, twin-engined high-wing monoplane we told you about is built to the Air Corps specification for a smaller, faster bomber . . . **Lockheed, Vought** and **Martin** all are entering ships for this competition that will be held in May . . . probably see a lot of radically new designs at Wright Field about that time . . . because the **Army**—due to some extent to **Navy** pressure—is turning away, for the time at least, from the long range, four-motored bomber.

* * *

Speaking of airplane motors the **Wright** company is experimenting with an 18-cylinder radial—supposed to give 2,000 h.p. for take-off . . . this engine already has reached the flying stage . . . it's a **Navy** project and if all goes well will be used in the **Navy's** big 80-ton flying boat that soon is to be ordered—or may be already under contract . . . furthermore the **Wright** people are also playing with three- and four-bank radials . . . the idea is to get a lot of power with a little bit of frontal area—relatively speaking—by putting a lot of cylinders around the same crankshaft . . .

* * *

Pratt & Whitney—someday we're going to get tired of telling the story of just these two motor manufacturers—is playing the same game . . . P & W is puttering with a 2,500 h.p. engine and has built a propeller to absorb this much power . . . it's that 17 foot prop, the biggest ever built to date, that you may have seen in some of the newspapers recently . . . you may have wondered that the newspaper captions didn't mention what motor was to turn that propeller.

* * *

Add coincidences . . . just a few days after **United Air Lines** recent accident near San Francisco, that airline's house organ, the United Air Lines *News*, came out . . . each issue carries an "honor roll," as did this issue . . . heading the honor roll was a paragraph that said "During the months of September and October the following employes attained ten years service with the company and were awarded diamond studded service pins" . . . first name at the head of the list was Captain **Charles B. Stead**, the pilot who flew the ill-fated airliner just a few days before . . .

* * *

This is for those of you who still believe **Douglas Corrigan** really was so dumb as to commit an error that took him across the Atlantic instead of back to California . . . at the time of his "mistake" Mr. Corrigan was the holder of a non-scheduled instrument rating (No. 4674) in addition to his transport pilot's license . . . that's as high as you can go without becoming an airline pilot . . .

American Export Airlines—the company that's trying to compete with **Pan American** across the Atlantic—wants **Dick Merrill** to fly its first survey boat across the ocean . . . they've been trying to get **Eddie Rickenbacker**, head of Eastern Air Lines and Merrill's boss, to give Dick a year's leave of absence . . .

* * *

Remember the old Bureau of Air Commerce's "roadable autogiro" that got so much publicity a year or so ago? . . . well, you'll probably see another of these driving-and-flying machines before long, for **Don Luscombe** is building an all-metal one at his factory at West Trenton, N. J. . . .

* * *

Many folks in aviation—most of whom are entitled to the courtesy—have been refused inspection flights in the **Douglas DC-4** . . . the **Douglas** company's reason for this ban is the Civil Aeronautics Authority's experimental license posted in the ship which says that "absolutely no one, with the exception of the ship's *bona fide crew*," is permitted to fly in the **DC-4** . . . but, not long ago, a British peer who is a friend of Mr. Douglas, broke that regulation by flying in the ship for a considerable period . . . not only was the Britisher not a crew member, he was not even an American citizen . . .

* * *

The item in one Hollywood columnist's yarn the other day that said that **Edgar Bergen** had taken up "stunt flying" is silly . . . Bergen is learning to fly under the tutelage of **Tex Rankin** out at Burbank, California . . . the "stunts" are just the routine maneuvers with which any student must be thoroughly familiar for safety's sake . . .

* * *

The **Navy** has learned a new trick with its engines . . . they used to have a lot of trouble from corrosion of cylinders and crankcases from salt spray . . . They've practically solved the difficulty by having pure aluminum sprayed on these parts at the motor manufacturers plant . . . the aluminum resists corrosion . . . it also turns the motor white . . . it may startle you one of these days to encounter one of these white engines suddenly.

* * *

All the **Curtiss** propellers now being manufactured for the **French** government's **P-36** fighters are having their blades painted black . . . the idea is no reflection from blades during night landings . . . funny part of it all is that the paint probably will come off with the first rainfall the plane flies through . . . or the first dust storm . . . the **British** do the same thing but have an anodic process that etches the black pigment into the blades.

* * *

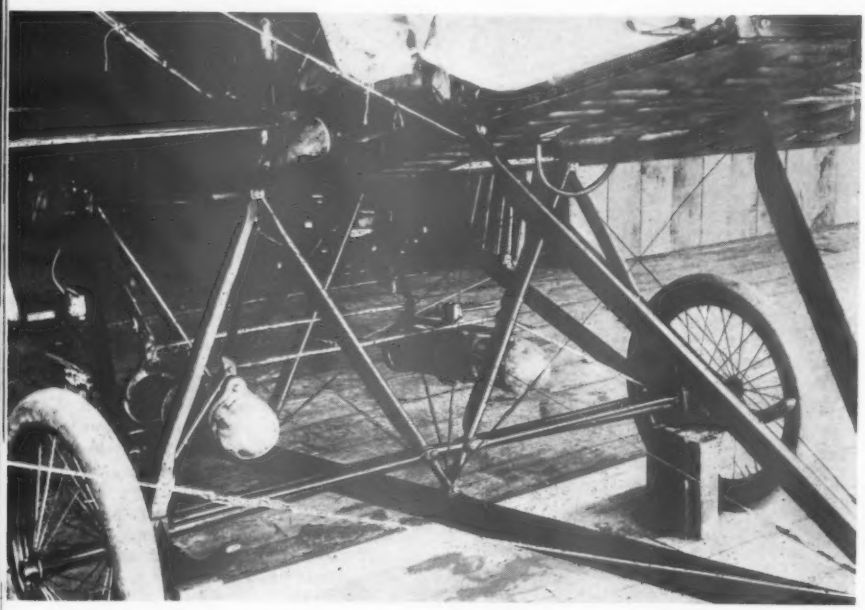
A ruling on scrip accounts (the purchase of bulk airline transportation for a reduction in price) is costing the airlines a pretty penny . . . the **Civil Aeronautics Authority** enforced a regulation in connection with selling scrip which terms the purchase of tickets by a scrip card holder for anyone he wishes, as

(*Continued on page* 89)

Cradle OF AVIATION

by HAROLD KEEN

To most aviation old timers today the name Rockwell Field recalls many fond memories. With the passing of that famous Army base we salute its memory.



The Army Air Corps' first bomber (above) was tested at Rockwell Field. One of the bombs between the ship's wheels made the world's first aerial bull's-eye below.

THE cradle of Army aviation is being dismantled. Into the Valhalla of American airmen are being consigned the memories, the glorious legends of a field which knew squadrons of immortals.

By February 1, personnel and $30,000,000 worth of equipment will have been transferred from Rockwell Field, on North Island in San Diego Harbor, to the Army Air Corps' new depot for the west coast, Hawaii and the Philippines in Sacramento, California.

On that day, the final page to the foremost account of Army pioneering in the air will be written. Rockwell Field, site of the first year-round Army training center and the starting point of virtually all record-breaking flights by the "early birds," will be fully decommissioned.

The story of Rockwell Field dates back to the winter of 1910, when Glenn Curtiss came to San Diego with an exhibition team and planes. He had been manufacturing aircraft in a factory on the shores of Lake Keuka, Hammondsport, N. Y., but the winters were too severe for flying and even warmer weather in the east had its disadvantages. Wind velocities in the daytime caused flyers to entrust their lives to their frail craft only in the early morning and late in the evening, when fatal gusts were least likely to slap them back to earth.

Mr. Curtiss was impressed with the San Diego climate, with the facilities offered by North Island, with the quiet bay waters which would enable him to continue his hydroplane experiments.

He was granted the use of North Island for a period of three years beginning February 2, 1911, and immediately established an aviation school, with three buildings for shops and hangars. This modest little school, located in the midst of a hunters' paradise where quail and jackrabbit abounded, had all of three planes operating at any given time. Today more than 350 aircraft are stationed on North Island, the nation's greatest Naval aviation base.

At College Park, Maryland, about this time, the fledgling Army Air Service was having the same difficulties Mr. Curtiss had experienced at Hammondsport. In the winter, the school had to be moved south, bag and baggage, only to return during the summer. This proved such an expensive operation that the Signal Corps, under which the Air Service then functioned, began a survey of the United States to locate an area where existed minimum temperature variation and low wind velocity.

San Diego, with its equable year-round

In Glenn L. Martin's flying days he was one of Rockwell Field's first pilots.

Capt. "Benny" Foulois (later chief of the Air Corps) was at Rockwell in 1914.

Lieut. L. E. Goodier made the first flight over Rockwell Field on October 10, 1912.

climate, its average wind velocity of only 5.6 m.p.h., and its North Island, where Glenn Curtiss' training school already was established, was chosen successor to College Park as the Army's training school site.

Meanwhile, trouble on the Mexican border had caused College Park's flyers to be transferred to Texas City, Texas, on emergency duty. It was planned to send officers and enlisted men from there to San Diego for instruction.

The first detachment to arrive at Rockwell Field, eight enlisted men under Sergeant James Hartman, caused not only a hubbub but a dislocation of the messing and quartering facilities at the only Army post in the vicinity—Fort Rosecrans.

Sergeant Hartman calmly surveyed the situation, obtained a rowboat, paddled over to North Island from the fort across the harbor entrance channel on Thanksgiving Day, 1912, and set up his own camp. For meals, he made arrangements with a San Diego lunch room, and the Army Air Service's first flight personnel at Rockwell Field was ready to go to work. Two weeks later, Lieut. H. Geiger, Signal Corps, arrived to become the first commissioned officer in command of the Army detachment at North Island.

One month previous to the Army's occupation, Lieut. L. E. Goodier, on October 10, 1912, had made the first flight over the future site of Rockwell Field by an Army aviator.

Not until the following December 15, however, were the first Army planes received in San Diego. The flying equipment now consisted of two 60-hp. single-seater Curtiss craft, and one 40-hp. single-seater instruction plane. The career of Rockwell Field was well under way.

No sooner had the Army encamped on North Island than the devotees of two rival training methods began a fierce and oftentimes near-disastrous competition.

Instruction in those days was either by the Wright or the Curtiss systems. In the former, dual control planes were used, with the instructor and student riding side by side until the novice learned to maneuver the plane alone.

Under the Curtiss method, which was more widely used on Rockwell Field, the beginner virtually hopped, skipped and jumped into acquaintanceship with the craft's controls.

Maj. Theodore C. Macauley, Air Corps Reserve, present executive manager of the San Diego Chamber of Commerce and an "early bird" holder of as many as 20 American and world records simultaneously, was in charge of training for the Curtiss Company then. The officers who preferred the Curtiss method received their instruction as follows, Major Macauley recalls:

"Use of the rudders, elevators and ailerons was learned by a series of cautious leaps only a few feet off the ground over extremely short distances. No turns were allowed until two or three days before the pilot's test was taken.

"The flyer merely bounced along from one end of the field to the other, then stopped, turned around on the ground and came back."

It was only after they learned to turn in the air and set as free as a bird that the young officers met unexpected situations and occasionally had to be fished out of the bay. As a matter of fact, the first Army accident at North Island occurred February 18, 1913, when Lieut. L. E. Goodier, the officer who made the first flight over Rockwell Field in an Army plane, attempted to turn while too close to the water in a flying boat. He was seriously injured, and two months later, Lieut. Rex Chandler was killed on a fall into the bay—the first Army fatality.

It is into these new quarters at Sacramento, Cal., that the last vestige of historic Rockwell Field now is being moved. Equipment worth $30,000,000 is being transferred.

The man about to "bomb" Grover Loening is Riley T. Scott, who dropped first bombs from the air.

The intense rivalry of the Wright and Curtiss camps developed to a dangerous stage, with followers of each attempting to outshine the others in air maneuvers. Accordingly, in February, 1914, a "consolidation" was effected, and all Army planes in Curtiss hangars were moved to Rockwell Field. Shortly after, Glenn Curtiss moved his equipment away from North Island entirely to concentrate on mass production of planes for World War service.

Army flyers learned so quickly at Rockwell Field that only a few months after the Air Service came to North Island, American and world records were being shattered.

In rapid succession, the following marks were set:

March 28, 1913—Lieut. T. D. Milling remained in the air 4 hrs., 22 min. in a Burgess plane with a 70 h.p. Renault engine, a world record for two-seater planes.

December 26, 1913—Lieuts. J. E. Carberry and W. R. Taliaferro reached 7,000 ft., an American altitude record for two-seater planes.

February 14, 1914—Lieut. T. F. Dodd flew 246 mi. in 4 hr., 43 min., an American record.

October 8, 1914—Lieut. H. L. Muller climbed to 17,441 ft. in a Curtiss Type "J" tractor plane, an American altitude record.

January 5, 1915—Lieuts. J. E. Carberry and R. E. Christy ascended 11,690 ft., an American altitude record for two-seater planes.

January 5, 1915—Lieut. B. Q. Jones remained aloft more than eight hours, an American endurance record, superseded September 17, 1915, when Lieutenant Taliaferro stayed up 9 hr., 48 min.

February 15, 1916—Civilian Inspector Floyd Smith, with three passengers, climbed to 8,603 ft., a world's hydroplane record.

February 10, 1916—Corp. A. D. Smith, in a Martin hydroplane, stayed in the air 8 hr., 24 min., a world's hydroplane endurance record.

Today these feats seem puny indeed, but two decades ago they were the talk of the aviation world, kept U. S. Army flying up among the leaders, and set the stage for the outstanding accomplishments of the Air Corps in the '20s and '30s.

The officers who served either as instructors or learned their flying at Rockwell Field before the World War later became leaders in American military aviation. On the 1914 roster were such illustrious names as Capt. B. D. Foulois, who rose to major-general and head of the Air Corps; Lieut. Henry H. Arnold, now chief of the Air Corps; Lieut. Walter G. Kilner, recently promoted to brigadier-general and assistant chief of the Air Corps; Lieut. Herbert A. Dargue, now a brigadier-general; Lieuts. Ira Rader, Edgar Gorrell, Henry W. Harms, Leslie MacDill, Shepler W. Fitz Gerald, and many others, including those mentioned above in record-breaking performances.

Rockwell Field was the scene, in April, 1914, of the first systematic bomb-dropping experiments in the world. With "bombs" that looked like harmless Fourth-of-July skyrockets, Riley T. Scott, a former Army officer, conducted the tests with a bomb-dropping device so astonishingly accurate for 1914 that, from an altitude of 800 ft. he made four hits out of five attempts from a plane piloted by Lieut. T. F. Dodd. The slight indentations made in Rockwell Field's surface were quite proudly photographed for posterity.

In that year, the aviation school on North Island operated on a budget of $14,983, which would hardly make a down payment on one of today's Army bombers.

With the increase in flying activity, the inevitable Army rules and regulations began making their appearance. In the first General Orders for Rockwell Field issued January, 1915, were included such requirements as the following:

"Dogs without collars and muzzles will be shot."

"Horses will be tied on the picket line provided for private mounts and not to trees, fences, water pipes or buildings."

And to all prospective students, an illusion-shattering memorandum was issued. The officers operated on the assumption that a young fellow who wanted to fly after reading this document was made of hardy stuff, indeed. For instance:

"Do not enter this branch of the Army lured by hopes of higher pay."

"If you hate work, don't take up aviation."

"If you are a bluffer, don't take aviation, you cannot expect to bluff the atmosphere."

"If you expect to be married soon or are in love, don't take up aviation."

"Above all, if you are not physically fit for this, the strictest kind of service in which you are under a constant strain, do not conceal this fact."

The first Air Service operating unit established in the United States was organized in December, 1914, at Rockwell Field under the designation "First Aero Squadron," with Capt. Benjamin D. Foulois as commanding officer. And on July 26, 1915, quite a furor was raised when the unit, with 15 officers and 85 enlisted men, with their equipment, required an entire train, consisting of 15 cars, to move from San Diego for duty in Fort Sill, Okla. Today, with no fuss and feathers, 150 carloads of airplane parts and machinery have been transferred from Rockwell Field to Sacramento and the 400 persons, civilian and military personnel, employed at the North Island air depot, almost all have "pulled stakes" with no ceremony.

During the World War, the picture at Rockwell Field changed in two important respects. First of all, the Navy's aviation section discovered that North Island would be as ideal for its purposes as it had been for the Army during the previous five years. Accordingly, the Secretary of the Navy and Secretary of War came to an agreement whereby their respective services would become bedfellows on North Island. A boundary was established to set off a greatly diminished Rockwell Field from the Navy's portion of the island, and on September 8, 1917, men in blue moved in, occupied two old buildings and the former Curtiss school seaplane hangar. This was the beginning of a gradual encroachment by the Navy, culminated slightly more than two decades later when the Army was literally "squeezed out" of North Island.

Secondly, primary flying training was stopped at Rockwell Field in favor of pursuit and gunnery instruction, and by the end of the War, American officers returning from foreign aviation schools declared the Army's pioneer base without a peer in the world as an advanced training center.

During the War, Rockwell Field suffered acute growing pains. For example, there were only 38 officers, 527 enlisted men and 54 planes in July, 1917, as compared with 696 officers, 1,702 enlisted men and 424 planes in December, 1918.

The roll of officers on duty in this period is studded with names of early birdmen whose fame has lingered to the present. These included the late Maj. W. R. Ream, one of the first flight surgeons of the Army Air Service; Capt. Roscoe Fawcett, now a noted publisher; Norman Ross, who held many world's

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STRIKE!

This pilot has his hands full. He is almost mushing in for a landing amid treacherous wind currents, hundreds of obstacles and a narrow landing platform hastily thrown together by men in the mills.

by GEORGE R. REISS

This is the story of some gallant flying and the daring band of airmen who made history doing it.

NOW it can be told—that thrilling, adventuresome saga of that daring reckless band of air pilots who flew in the "Little Steel" strike.

Never have a squadron of war flyers, waiting for their turn at a patrol, lived more recklessly, more dangerously than this little band of daring pilots who tempted fate, goaded her, laughed contemptuously in her face, for 28 days.

They flew as no sane man would fly. They flew in bad weather without proper equipment; they flew when a motor's miss must mean instant death; and they flew where the slightest miscalculation might cost scores of thousands of dollars in damages.

They put down heavily-loaded airplanes, hour after hour, day after day—daylight 'till dark—into tiny spots in which no man with a consuming desire to live would dare to venture. They landed in spots made more treacherous by the savage swirling air currents, which whipped around the tall stacks and buildings and mingled with the cloudy vapors of the steel plants to upset all accepted theories of flight.

And they did it expertly, flying low and slow, while hidden snipers' high-powered bullets whined savagely, pinging through the fabric of wings or fuselages, smashed through the cargoes or ricochetted off metal fittings or engine parts and screamed into space.

The real miracle was not that men could fly into such spots—but that not a pilot or passenger was injured or killed in all that hail of high-powered bullets or in the few crashes.

But in that 28 days was demonstrated, as was never demonstrated before, the utility and the versatility of the airplane.

Yes, this is the saga of the "Little Steel" strike flyers.

It's the saga of William Kirk, Warren, Ohio, the youngster who flew the 28 days with that daring band on only a student's permit and it is the saga, too, of the veteran pilots, of Preston Mood, "Pappy" Hunt, Tom O'Malley, Clay Swager, Mike Murphy, Ben Swineford, Frank Groat, Craft, Campbell and the others.

"The Battle of the Mahoning Valley" in the 1937 "Little Steel" strike was undoubtedly one of the bitterest, most far reaching conflicts in American industrial history, spotted with gory industrial conflicts, and the flying jobs that accompanied it probably were the greatest triumphs of airplanes in American history.

Just a bit of the history of the conflict:

The Steel Workers Organizing Committee, affiliated with John L. Lewis' Committee for Industrial Organization, or "CIO" as it is more familiarly known, had demanded a written contract from the huge Republic Steel Corporation, third largest steel producing company and the somewhat smaller Youngstown Sheet & Tube Company.

The Carnegie-Illinois Steel Corporation, the largest steel company had signed such a contract. So had other large steel companies. But Tom M.

This was a tight squeeze but he made it. The pilot dead-sticked down onto the landing platform but swerved suddenly and dropped a wheel into a hole. Damage was slight.

Girdler, chairman of the board of Republic and one of the most forceful men in American industry, flatly refused to sign such a contract. The Youngstown Sheet & Tube Co. followed in this refusal.

And, finally, "zero hour"—11 p. m., May 26, 1937—was set by the Steel Workers Organizing Committee. Then, at zero hour, 25,000 steel workers—some of the most able, most skillful workers in the plants—calmly finished their tasks and then walked out of the huge sprawling plants of the Mahoning Valley leaving another 5,000 to 10,000 men inside.

Thus was begun "The Battle of the Mahoning Valley." Strikers quickly threw a heavily-armed picket line around the plants, blocking persons or supplies from entering and, with public sentiment chiefly on the strikers' side, those workers remaining in the plants were virtually prisoners.

Preparing for such an emergency, the steel companies had stocked their plants with food, clothing and bedding—but not sufficiently. And the situation quickly became acute, particularly at the Republic's plant located at Warren and Niles, Ohio.

The Niles plant still was occupied by about 500 men and women left from its normal force of about 1,500 and the huge Warren plant, three miles away, had 1,500 of its normal force of about 6,000. And, for a time, it appeared the strikers might yet starve those within into submission.

"You've got to get us food and clothing—and quickly," demanded harassed officials within the plants in telephone conferences with officials outside. Telephone communication was still open but you can't telephone food and clothing as you might photographs.

"You'll get your supplies—regardless of the cost," grimly assured the officials outside, fearing wholesale desertions of the workers in the plants.

But how to get these supplies into the plants? That was the problem. The pickets, armed with pick handles, clubs, stones and even with rifles and pistols turned back the supply trucks at the mill gates. They refused to permit freight cars to enter or leave the mills' private rail yards, and even turned back U. S. Mail trucks.

"Let's try airp'anes," advised one official.

But even expert flyers were pessimistic about the chances of any substantial success by this method.

One charter service operator flew over the plant, then advised: "It can't be done."

He turned down the job. Others similarly refused it. They pointed out the dangers of dropping supplies into the plants from the air or attempting to land in the yards and of the tricky air currents swirling over the plants.

But the steel officials refused to be convinced.

"We'll try it," they said. They chartered a small plane with which they experimented, dropping packages of food into the Niles plant's parking lot.

But this experiment was not exactly a howling success. The pilots, inexperienced in "bombing," dropped many packages outside the plant yard. They were promptly confiscated by the pickets. Many packages were ruined by the fall—for it doesn't improve the flavor nor quality of canned goods by smashing them flat on a roadway, nor does it improve beef by pitting it with cinders and dirt.

The pickets were jubilant, glad of the new diversion, and waved friendly greetings to the low-flying pilots as they swooped overhead for the first two or three days.

"Let them drop the food," said one strike leader. "Let them waste their money—and that will end the strike only so much sooner."

But their joy was short-lived. One of the venturesome pilots successfully landed a plane on a short roadway inside the Warren plant yard, and steel officials were convinced of the success of the experiment.

They hurriedly combed Ohio airports for available airplanes, buying up a fleet of used Wacos, good and sound airplanes ideal for the job because of their ability to get in and out of small places. They even bought an autogiro and sought a Ford tri-motor but these were never used.

And they recruited a crew of pilots, a reckless, happy-go-lucky crew, willing to take risks for good pay, $25 a day and expenses. The pay, incidentally, never approached the sums declared in the wild rumors of the time—running in some stories up to $20 a minute. Some of these pilots were professionals, others worked in Republic plants and flew for fun, one came from a garage—but all were attracted by the pay and spirit of adventure.

A crew inside the Warren plant hurriedly built a pine board runway, while another crew prepared the abandoned Great Lakes Aircraft Corporation plant and airport at Cleveland as a base where food and other supplies were transferred from freight cars to planes, later to be flown to the strike-beleaguered plants about 50 miles away.

Then began one of the most spectacular flying jobs in American industrial history. Scores of tons of food and supplies were landed safely in the two plants by the fleet of nine planes, which shuttled back and forth from daylight until dark.

The steel company experts developed a heavy canvas bag which, holding about 80 pounds of supplies, protected its contents from damage in a fall and the pilots' aim was improved miraculously by the offer of a $10 bonus for each package landed safely.

Now, virtually all the food and supplies were landed either on the pine-board runway in the Warren plant or were dropped within the Niles plant's parking lot.

The cargoes included nearly everything and anything the 2,000 imprisoned men and women might want—the latest newspapers, books and magazines, new movies, sides of beef, bunches of bananas, crates of apples, Swiss cheeses, lettuce and celery, loaves of bread, freezers of ice cream, new clothing and, most important of all—mail from home.

The strikers' tolerant smiles turned to frowns of annoyance, then to scowls of frustration and they began an effort to defeat the planes. Snipers, armed with shotguns and rifles and hidden in ditches or trees or clumps of woods, fired upon the slow low flying planes.

The pilots, intent upon landing or dropping supplies, were unable to maneu-

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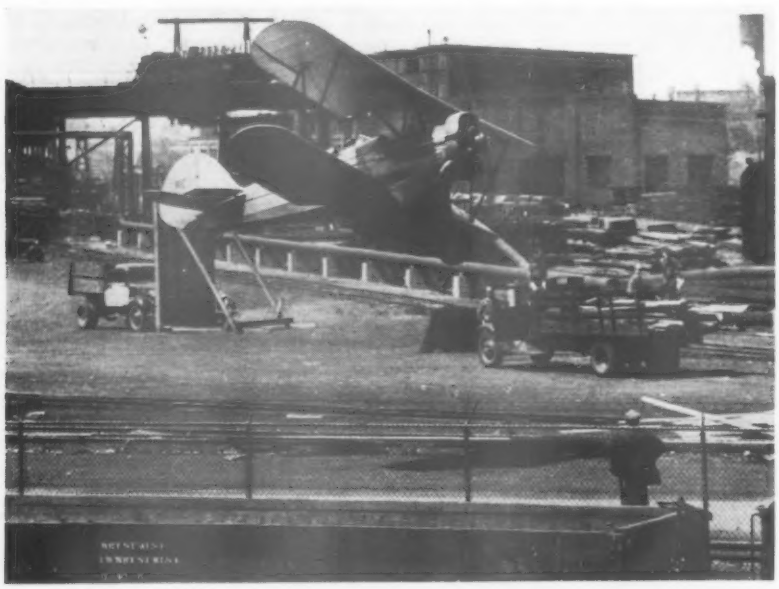
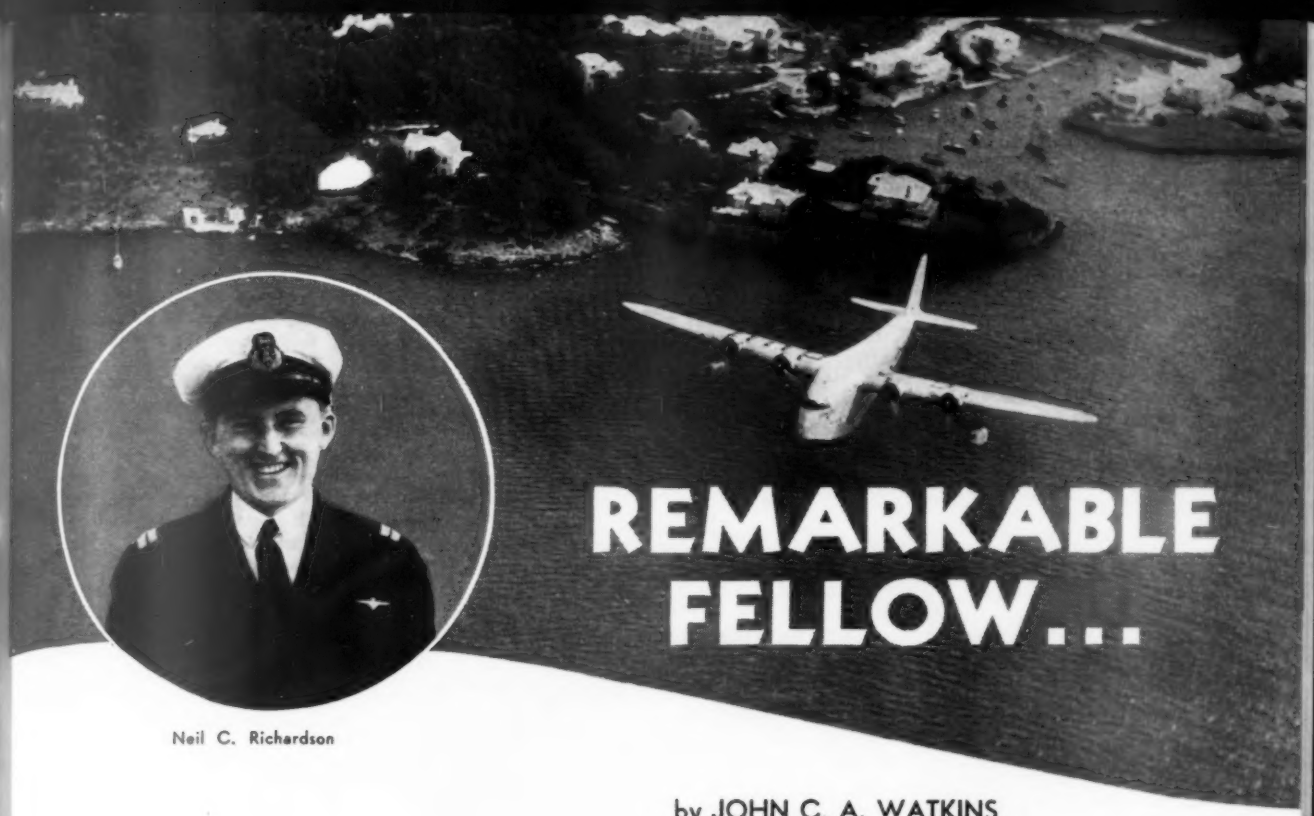
Here's a picture of an accident about to happen. The pilot has just bounced off the road and, a second after this picture was taken, crashed into a freight car.





REMARKABLE FELLOW...

Neil C. Richardson

by JOHN C. A. WATKINS

We Americans call them co-pilots. But Neil Richardson is far more than the title implies. This amiable young Britisher has flown all over the world, had many a bizarre adventure and is an able inventor to boot.

A YOUNG British pilot who has made a habit of setting records throughout his entire professional career right now is busily engaged on this side of the Atlantic in piling up another which his flying compatriots and American associates are going to have difficulty matching.

The pilot is Neil Richardson, first officer of the Imperial Airways' luxurious flying boat *Cavalier,* since that aircraft made the first survey flight from Bermuda to the United States almost two years ago.

His feat: More than 250 trips between the islands and this country, covering a distance equal to almost *eight flights around the world at the equator.* As this was being written, he was adding steadily to this flying record at the rate of two round trips a week—1,600 miles or so per round trip, 90 flying hours a month—between Bermuda, New York and Baltimore.

That is a remarkable record, no matter how you look at it. In the first place, the 800-mile Bermuda-United States course is the longest over-water route on Imperial Airways' entire, almost world-girdling network. Second, no pilot flying for Pan American Airways, the British airline's competitor on the run, could approach this record, because he would be amassing more flying time each month than regulations of the American line permit.

Pan American has two complete crews —with two captains—alternating aboard their *Bermuda Clipper* on its twice-weekly trips, partly as training for future transatlantic operations, but more particularly to avoid having its flight personnel accumulate too much time. Imperial has but one crew, and that a considerably smaller one with consequently increased duties for each man, doing all the flying week in and week out.

Not only that, but flying this "transatlantic" route is a whole lot harder for both the British and American pilots than it would be, say, to fly from New York to Chicago. The officers of the flying boats have to navigate their craft, and hit 17 square miles of land out in the vast expanse of the Atlantic ocean right on the nose every time. There are no beacons along that, or any other, stretch of sea, and there is no radio beam to help them keep their course. To find that little patch of green that is Bermuda, constant celestial navigation is necessary.

Lieutenant Richardson, who does most of that essential navigating, stands alone in Imperial's organization in this part of the world, so far as flying time and length of uninterrupted service are concerned, because he is the only flying officer who has been a member of *Cavalier's* crew since the great ship first took off from the waters of Hamilton harbor in May, 1937, and pointed her nose toward Port Washington, Pan American's intermediate base on Long Island Sound. Captain William N. Cumming, who was master of *Cavalier* then, returned to England last summer and was succeeded by Captain Marmaduke R. Alderson.

Richardson, a sandy-haired, ruddy young Englishman with a big grin and a sense of humor that belies his British ancestry, has had an unusual life, since his birth in Yorkshire 35 years ago. His background indicates why he is considered to be one of the outstanding figures in that select group of aviators, the over-ocean pilots.

After graduating from public school he joined the British merchant marine service, qualifying as a master mariner at 22, serving eight years in that profession and gathering experience in practical navigation which has probably made him unique in his own organization.

His first five years as a merchant marine officer were uneventful, but in 1925 he was assigned to a ship operating up and down the Yangtze River, in China, and for three years had as exciting a life as any merchant officer probably ever had in a time during which his own country was at peace.

Generalissimo-to-be Chiang Kai-Shek was engaged in creating a unified China, and one of the results of that eventually

successful move was the great riots in Nanking and Hankow, during which scores of Americans and Britishers were in danger of losing their lives. That was the period, some of you may recall, during which the captain of an American destroyer shelled one of the two cities—I've forgotten which, although I was over there myself at the time—and broke up at least one bit of trouble in short order, although he brought down upon himself considerable international wrath.

Young Richardson had a busy time of it, assisting in the evacuation of nationals of both the English-speaking countries and, in the meantime, keeping a weather eye cocked for the arrival of pirates who swarmed on all the navigable streams of the country, pillaging and plundering any helpless vessel that happened to come within their blood-thirsty reach.

Worse than that, he and his fellow officers had to dodge shells from Chinese "army" guns and those of the foreign warships that were protecting their countries' "interests" by opening fire occasionally on cities up and down the great river.

His first acquaintance, so to speak, with the United States came when he was standing by to evacuate refugees from Chinkiang, and contacted a California "ham" with his own little egg crate and bailing wire transmitter, the only amateur short wave set on the river. He calmly described to the American, salvo by salvo, the bombardment of the city and its forts by a Japanese destroyer, practicing, no doubt, for the current rape of China. The "ham" passed the information on to his local newspaper, which publication probably scooped every other newspaper in the country on the story.

Death came very close at Nanking. While the ship was taking aboard refugees, Chinese troops opened fire on the craft. Bullets whistled by. Help was necessary, and the nearest appeared to be in Hongkong, 800 miles away. Richardson got his little transmitter into action with a display of speed he probably hasn't shown since, tapping out under fire a call for help. After anxious minutes an amateur in Hongkong answered his call, promising to relay the distress signal to the Hongkong Dockyard.

Suddenly the officers aboard the merchant vessel picked up *searchlight* signals from a British man of war! It was the gunboat *Scarab*. Exactly 11 minutes from the time he had established contact with the Hongkong ham, the Dockyard had relayed his appeal for assistance to the *Scarab* by long wave. A 1,600 mile triple play! Richardson to Hongkong to gunboat.

Carrying on, during the more or less "quiet" periods he used his transmitter to order emergency supplies from Shanghai for the sorely-pressed foreigners in the cities along the river, and to send messages to the States and England, assuring anxious relatives that their missionary kin in the war zone were safe. Mission medical supplies were ordered direct from the United States through California amateur operators who forwarded the requests through the American Radio Relay League. "You Americans!" Richardson exclaims with admiration, when he discusses that hectic situation.

However, nothing particularly romantic happened during those somewhat perilous three years. It was just plain hard work, with bullets zipping by for an occasional relief from the "monotony." In 1928, still quite as healthy as when he went out, Lieutenant Richardson left China and carried out a series of Royal Naval Reserve courses which were concluded with a year's service on *H. M. S. Renown*, during which he went with the battleship to Gibraltar and lived the quiet but interesting life of a junior naval officer in time of peace. He wound up this phase of life with a tour of duty aboard the destroyer *Westcott*.

"Fresh fruit . . . candy . . . magazines . . . oxygen . . ."

His experiences in the Orient with pirates remained in his mind, however, and as a result of them he invented a device that has apparently been resurrected recently for use in aircraft crashes. When he left China and the Yangtze, piracy had been getting worse and worse, so as a protection for unarmed merchant vessels he worked out an automatic distress signalling device, intended primarily for ships having no conventional radio equipment, but just as useful for those which were provided with transmitters and receivers.

As the vessel proceeded on its course, its position was dialed at regular intervals on an instrument. At the first sign of trouble, any one of a number of push buttons concealed in various parts of the ship was to be pressed, and automatically a powerful, battery operated spark transmiteer would begin sending out a combination signal which operated alarm bells at the receivers of ships equipped with the device (most of those having only one operator were), the distress signal repeated three times, followed by the call signal of the ship being attacked, and the last position which had been dialed.

The wily marauders knew enough to wreck the radio equipment of a ship when they first boarded her, but once started, it took more than a Chinese river pirate to stop Lieutenant Richardson's gadget, because the transmitter was mounted in a bullet proof case on the foremast, surrounded by a live aerial, and would continue sending out the call for help until the batteries were exhausted. It was a great aid to safety, and I believe a number of them are still in service, but for some reason the inventor didn't make a penny from it.

Lately, a similar device, probably inspired by his, has been introduced for aircraft use in a less elaborate form. As the tail section of an airplane's fuselage is rarely destroyed in a crash, no matter how bad, the idea is to mount a shock-proof set in that part of the airplane. If the ship crashes, the set automatically begins sending out signals which enable rescuers to determine the wreck's position with radio direction finders. A number of such ideas, apparently all based on the "Richardson Pirate Catcher" have been suggested or introduced lately in both this country and abroad.

Eight years ago aviation was broadening its scope tremendously, becoming a popular means of transportation both of passengers and goods. Lines were being extended across continents and over the seas. In this country the formal inauguration or regular commercial air service had come only two years before. Aviation was booming in Great Britain, too, and Lieutenant Richardson deserted the sea for the air.

He learned to fly at the famous Hampshire Flying School, where he qualified also as a second-class air navigator and air radio operator, and joined up with Imperial Airways. After taking courses at the factory where Imperial's Atalanta type ships were manufactured, qualifying at that time for the Air Ministry's engineers and riggers licenses, he was sent out to exotic South Africa on the line's first aircraft of that type. He became the first pilot in the British organization to hold, in addition to his pilot's license, those of radio operator, engineer and navigator. Not many airmen, regardless of experience, can lay claim to such versatility.

For the next couple of years he flew between Capetown and Kisumu, on the

(*Continued on page 74*)

A careful, conservative pilot can familiarize himself with a new airplane with little or no help. The author has done it.

CHECK ✓ YOURSELF OUT

by RODNEY H. JACKSON

Rodney H. Jackson

SLEEP had been out of the question the night before, although not exactly from any excitement over my ride in an Eastern Airliner. The overnight flight from Newark to Miami had been noteworthy only because it was the first time I had gone over that familiar airway as a passenger rather than at the controls myself. But awaiting me in Florida was a chance to fly a ship bigger and better than anything I had ever been in before, and upon my initial impression and success in handling this new (to me) giant of the air depended a new position, possibly permanent for several years.

So it was that I found myself, less than 24 hours out of the familiar pilot's seat in a Stinson SR-8, transferred to the cockpit of Mr. W. K. Vanderbilt's Sikorsky S-43, one of the largest and most beautifully equipped private air yachts in the world. Mr. Vanderbilt wanted me to take her out, spend as much time as I needed to learn to fly her, get my 4M land and water ratings, and be ready within a few days to fly a party of passengers North. My first thought had been to look up a few old Navy friends now with Pan American and ask one of them to act as check pilot, but after discovering that one had recently been sent out to Oakland, another was in Rio, a third away on leave, and a fourth just left for Barranquilla, there was nothing left for me to do but to go ahead and fly alone if the ship was to get into the air at all that day. The routine that I went through in checking myself out evidently was successful as I am still flying the Sikorsky, and may be of interest or even value some day to some other Aeronca, Fairchild, or Stinson pilot who has more or less the same background and experience as mine.

What small-ship pilot, upon seeing a picture of a modern transport cockpit with its seeming utter confusion of controls and instruments has not had a dream, or possibly a nightmare, of being left alone in the pilot's seat and given an "All Clear!" That same mixture of exhilaration and trepidation was really mine as I gave the signal for the ten-ton crane to lift the ship off its dolly and lower it into the water of Miami Bay.

I was not completely alone because

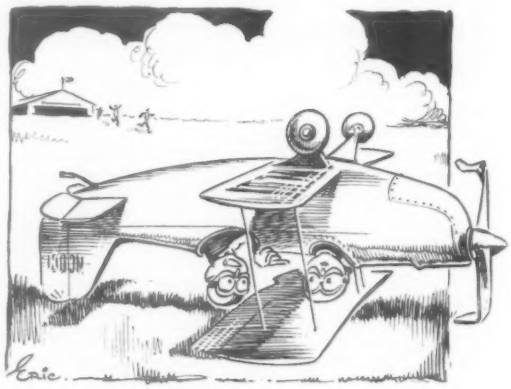
Below is the big Sikorsky S-43 which the author flies for W. K. Vanderbilt. It is this ship in which he checked himself out in the manner he describes in his article.

an airplane as big as the S-43 is essentially a two-man proposition, and I would really have been deep in center field with the sun in my eyes without the flight mechanic, Henry Gerstung, who had been flying in the right-hand seat as well as directing the maintenance of the ship since its delivery 18 months before. An hour in the cockpit, talking with him and going over the 186 separate levers, dials, doodads and gadgets had left me with the assurance that he knew his part of what had to be done and could probably give me many pointers on my part, although he had never actually landed or taken off.

The ship settled into the water and the sling was disengaged from the big hook and stowed away below as two endless lines maneuvered the Sikorsky out about 50 yards from the bulkhead, where we picked up our buoy. I watched the flight mechanic start the motors (gas on, main line switches on, wobble pump wobbled, throttles pumped twice to fill carburetor bowls, mixture controls full lean, throttles pumped again to prime, mixture controls returned to full rich, fire extinguisher selector valve set on correct engine, ignition switches on, starter lever pushed) while the second mechanic in the bow cockpit cast off and we headed down the narrow channel for a half-mile taxi. I wished we had had enough room to try out her water handling characteristics before take-off, but decided against it in such cramped quarters, with a shoreline of pine trees a couple of spans off to the starboard and mudflats even closer to the port. It seemed hard enough at the time to keep a straight downwind course, with a generous use of full rudder and both throttles, until we reached the end of the channel and noted that the oil inlet temperature had reached 140° and the heads were over 300°.

Letting her weathercock, which she seemed to do on the traditional dime, I looked questioningly at Henry. He smiled and nodded "Everything O.K." as I visually checked over all controls, automatic mixture setting in full power position, constant speed props at 2250 revolutions, stabilizer rolled a little back for lightly loaded condition, flaps at zero degrees and, finally and definitely, landing gear up. The throttles were opened slowly to 35 inches of mercury, and a few seconds after I pulled the wheel back she climbed up on the step with such a surge that we porpoised a couple of times before smoothing out into the normal takeoff run. Once off the water, the throttles were eased back to about 30 inches while the flight mechanic pulled the props back to 1950, raised the 15° flap (which he had given me for takeoff) gradually to zero, set the automatic mixtures for climb, and synchronized the motors. The ship was mine to feel out in the air, to "horse around" to my heart's content, and my trepidation had been completely replaced by the exhilaration of it.

Although seaplane flying was my old original first love and I had piled up plenty of time off the water, my previous experience with twin-motored boats was limited to the old Douglas T2D, a Navy torpedo plane whose two *Cyclones* used to cruise it at all of 90 some ten years ago; and a more recent summer on a Sikorsky S-38. There was a lot to find out about how my new ten-ton baby would behave under various conditions, and I would probably give her bottom some good sound spankings before we were through. However, before carrying passengers it did not seem too much to ask that I learn to fly it at least as well as I had always expected my students to fly the old Aeronca. That meant enough air work to go through all normal maneuvers smoothly, followed by takeoffs and landings of all shapes and sizes. We put in six hours of flying in those two days, including 50 landings, and the program was more or less as follows, in a summarized form.



". . . And that shiny thing you've got your foot on is the brake. . ."

First hour: Air work, right and left turns up with various degrees of bank, starting with 15° and ending up with 90°. Maximum climb and best glide with zero flap and with 15°. Stalls at 3,000 feet with zero flap and with 15°. Straight flight and turns with and against motor in single-engined flight. Three normal straight landings with full 40° flap and using throttle to try to keep them smooth. Water work, slow speed turns, crosswind taxying, control with flaps full down and landing gear down, taxying turns on the step with light wind, normal takeoffs with and without 15° flap.

Second hour: Eight landings divided between right and left "180's" and right and left "360's" to a buoy. Takeoffs crosswind and downwind with a light wind. Two crosswind landings. Two power stall landings.

Third hour: Land landings at both Municipal and 36th street airports (Miami) first normal and then spot. The 36th street field looked pretty small to try to get into without using any gun, but the 3,600-foot diagonals at Municipal proved ideal and we found it just as easy to get in with a "180" from 1,000 feet as it would be to put an Aeronca down on a runway a quarter as long. Use of brakes in taxying, turning, and stopping. Landings on a runway 45° off the wind, and takeoffs upwind, at 45°, and at 90°. With the strong tendency that the ship has of wanting to turn into the wind as it picks up speed, it was a question of learning just how much leeward throttle to use with full windward throttle, but after several takeoffs we were able to keep from veering off the runway even with a fifteen mile crosswind. As the S-43 carries so much weight on streamline tires she is distinctly a "runway airplane" and this practice was later to prove its value in cross-country trips to fields that had only one or two paved runways not always coinciding with the wind direction, as well as in water takeas in water takeoffs along narrow lakes or rivers.

Fourth hour: Practice overshooting, giving it full throttle just before the wheels touched, and bringing the flaps up slowly from 40° to 15°. Back to the water for single-engine landings, and cutting out one engine just after take-off, followed by the same thing on the airport, including a complete circle of the field after simulating a left engine failure, making a single-engine approach and landing. I will not soon forget how that felt—which may be a good thing to remember some day.

Fifth hour: Full load take-offs and landings, first on water and then on the airport. Four more "180's" with full load. Practice setting and turning on Sperry automatic pilot and controlling ship with the knobs, making it climb, glide and turn. Radio familiarization, tuning both receivers, trying out the direction finder, and using the transmitter for two-way conversation with Miami. Checking behavior of flight instruments on climbs, glides and turns last three hours.

Sixth hour: Handling the ship on instrument, with the cockpit hood up. Shooting the Miami range at 800 feet, making the 30° turn and letting down to the edge of the field and an imaginary 300 foot ceiling. Making two fully blind water landings, without radio, from 400 feet in the wide lower bay, with the flight mechanic watching out carefully for stray fishing boats.

While on the ground, a good deal of time had been spent reading operation manuals and in going over the cockpit arrangement. I did not want to repeat the experience of the airline pilot, who, after four years flying as captain in a Douglas, had one fuel pump go bad on him in the air and had to radio in to the maintenance department to find out (1) whether or not there was a cross-over valve, and (2) if so, where, so that he wouldn't have to wobble pump his way to the next field. One of the easiest

(*Continued on page* 70)

Letters

Correction

Sirs:

. . . ("Airplanes by the Dozen," January, 1939) is well received . . . only regretable incident is the title under the experimental bomber which . . . has been purchased for some time by the U. S. Army and is known as the XB-21. This airplane is to be used in service tests to determine its usage in a field not yet covered by the Douglas bomber. . .

H. C. TAFE.
North American Aviation, Inc.,
Inglewood, California.

Censorship

Sirs:

While I admire your magazine, it is disturbing to find you taking issue with the armed air forces over the matter of censorship. Why not take it for granted that the services are just now becoming aware of the necessity of guarding their new things instead of . . . being anxious to show it to everybody. . . Not only cooperate but give them any information about how to apply a censorship, where to apply it and when to apply it (so that it) would be helpful to the . . . air services. . . . If you cannot get along with the men charged with censorship and be of some help to them, you are not half as smart as I am giving you credit for being. Get records of all your staff and submit them to the censors for a clean bill of health as far as the personnel is concerned, then cooperate after the censors have been relieved of the necessity of suspecting you. . .

STANLEY D. O'SHEA.
Madison, Wisconsin.

• Many thanks to Reader O'Shea for an excellent idea. We hasten to point out, however, that our criticisms are based purely on facts involving comparatively old, well-known aircraft. Example is the photograph of the Ford experimental bomber shown in "Farewell, Tin Goose!" elsewhere in this issue. Though this airplane has been obsolete for more than five years the Army Air Corps refused us a photograph of the ship a few weeks ago. It so happened that one of the editors had an official Air Corps photograph in his personal files that had been released to him about five years ago. Inconsistencies like this we feel justified in objecting to. Both Army and Navy aviation officials well know that POPULAR AVIATION has withheld really confidential information and photographs at their request many times and will continue to do so in the future.—Ed.

On Soaring

Sirs:

The article on "Soaring Your Lightplane" (January, 1939) contains a lot of interesting data for the aeronautical engineer. Since the sinking speed and the gross weight of an airplane constitute the minimum horsepower required, a lower sinking speed would indicate an improved airplane for the same wing loading. A shorter take-off, a better climb and a faster ship would be the result . . .

RAOUL J. HOFFMAN.
Chicago, Ill.

Photographs (Cont.)

Sirs:

We were very much interested in the photograph and comments concerning Army Air Corps photography . . . in the December issue of POPULAR AVIATION. Enclosed with this letter is a photograph of a

Stearman PT-13A primary training airplane taken at the Stearman plant just prior to its delivery to . . . Randolph Field. This photograph was taken December 27, 1937 . . .

J. E. SCHAEFER,
Vice President.
Stearman Aircraft Co.,
Wichita, Kansas.

• Mr. Schaefer's thoughtfulness in sending us this picture is appreciated, but he is just one year too late to be of much help. Publicity-minded manufacturers will do well not to bury such material in their files.—Ed.

What Carrier?

Sirs:

. . . After pulling my hair for weeks I have finally . . . come to the conclusion that this picture is of the *Lexington* . . .

MARK D. STENSON.
Minot, North Dakota.

Sirs:

I believe the aircraft carrier pictured is the *U. S. S. Saratoga* . . .

RICHARD GOOD.
Cedar Rapids, Iowa.

Sirs:

. . . The name of that carrier is the *U. S. S. Yorktown* . . .

JOHN BOYD.
Sanford, North Carolina.

• Reader Stenson and about 50 other readers are correct. The carrier shown in the November issue was the *U. S. S. Lexington,* is identified both by the letters LEX on the flight deck astern and by the black band running horizontally around the top of the ship's funnel.—Ed.

Puzzle

Sirs:

. . . Your puzzle in the January issue . . . caused me to study the picture a lot. But the time is the same for each leg of the course, 1 hr. 20 min. being the same as 80 minutes. About four minutes before I could figure it out.

W. M. WATSON.
Nashville, Tenn.

Sirs:

. . . I say that the plane was equipped with a controllable pitch propeller. The pilot changed the pitch after banking the second time.

BENTON REAM.
Norris, Tenn.

Sirs:

. . . 80 minutes is the same as an hour and 20 minutes. . . It took me 30 seconds.

P. S. Father's time: 4½ minutes.

DELBERT GUISINGER.
Washita, Okla.

Sirs:

. . . It took me four minutes . . .

JAMES E. BARLOW
Cascadia, Oregon.

Sirs:

. . . Are you trying to kid someone? . . .

HAROLD T. STUBBLEFIELD.
Fulton, Mississippi.

Sirs:

60 plus 20 equals 80. . . How far can a man walk into the woods? . . .

K. WAGNER.
Elcho, Wisconsin.

• (Aside to Reader Wagner: half way) Almost all of the hundreds of cards that still are coming in our mail got the correct answer: the time is the same on all three legs of the course. Surprising as it may seem, however, we personally tested this one on many a veteran pilot including the commanding officer of a Naval air base, three airline pilots and several advanced flying students of three west coast aviation schools. The puzzle originally was given POPULAR AVIATION by the vice president of one of the nation's leading airlines. He had tried it on many of his own pilots as well as others high up in the aviation industry. Secret of the problem's greatest success is in telling it, not writing it.—Ed.

Spain

Sirs:

We have liked your magazine . . . but we simply cannot stomach your articles on Spain . . . so do not care to have it in our home any more . . .

F. A. MARKOE.
St. Paul, Minnesota.

• Let Ex-reader Markoe confine his vengeance to more deserving quarters. Articles by a recognized American airman who flew in Spain, and whose experiences are acceptable to the *Saturday Evening Post* as well as POPULAR AVIATION, should not offend a broad-minded reader.—Ed.

Quick Work

Sirs:

. . . Please insert this ad in your "classified advertising" . . . Trade '36 Ford coach, recently overhauled, for biplane. Larry Holmes, Main Road, Millville, N. J.

* * *

WESTERN UNION

CANCEL AD. CAR DEMOLISHED. LARRY HOLMES.

END

Personalities

Steward Frank Gibbs, Pilot Dave Hissong and Co-Pilot C. R. Russell saved their passengers' lives in a recent crash, were decorated by J. V. Connolly, a passenger.

Guy Lombardo recently found an old friend, Bill Feeleck, working as an airline operator.

On a recent California endurance flight, Pilot Tom Smith chose this means of relieving Pilot Clyde Schleiper at the controls. They broke the record.

Gene Dowis of Santa Monica, Cal., has been selling planes, rides and lessons for 15 years. He claims 19,000 passengers and 600 pilots who soloed.

Mysterious Howard Hughes is said to be plotting another record-breaking flight.

Major Alexander Seversky is in Europe trying to sell ships to England and France.

A. G. "Burt" Kinsman has been named Northwest Airlines' general traffic manager.

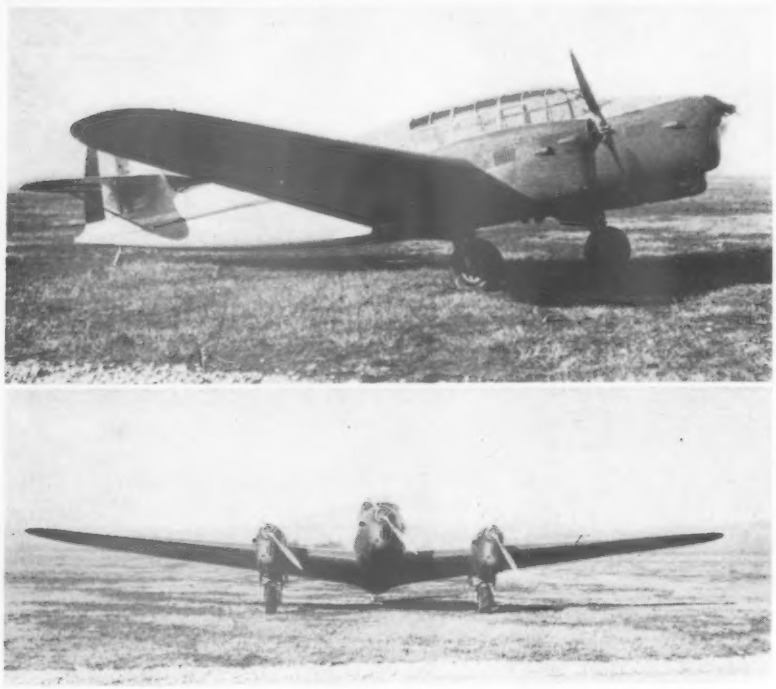
Ray Applegate, engine company official, has flown 21 years without an accident.

Lieut. B. S. Kelsey recently flew a P-36A from Dayton, O., to Buffalo, N. Y., in 61 minutes.

Alice Faye is starring in a new aviation film, recently took time off to read Popular Aviation.

Ernie Smith (left) and Emory Bronte flew to Hawaii 11 years ago, were recently reunited.

An Italian Light Transport



THE Italians call this ship, the Cant Z-1012, a "lightplane for touring" although it is a tri-motored six-place airplane. It is nonetheless an interesting design among new aircraft. The Cant is powered by three Alfa Romeo engines of 120 h.p. each but is stressed to accommodate three 185 h.p. Alfa Romeos. Both these engines are inline and air-cooled.

Designed by Filippo Zappata, prominent Italian designer of record-breaking seaplanes, the new Cant is intended primarily for touring with four people. It is constructed entirely of wood with fabric-covered wings and control surfaces. The ship has dual controls, flaps, brakes and retractable landing gear. Particularly good visibility upward and to the sides is available, as it is in all low-wing monoplanes. Fully loaded the ship weighs 5,500 lbs.; useful load is 1,760 lbs. Maximum speed is 186 m.p.h. at sea level and cruising speed (also at sea level) is said to be 161 m.p.h.

American Ship to Paris Show

EUROPEANS who visited the recent aeronautical show and display in Paris saw the Vought V-156, shown below, on display. The fact that this ship was displayed overseas is newsworthy inasmuch as this is practically a carbon copy of the Vought SB2U-1 scout-bomber currently in use by the U. S. Navy and subsequently restricted from inspection by Americans. The photograph below was taken as the ship was about to be dismantled for shipment.

Aircraft Production

ALTHOUGH the production of aircraft for domestic civil use in the United States for the first nine months of 1938 showed a decrease of 28 per cent compared to the corresponding period of 1937, military aircraft production increased 95 per cent and an increase of 36 per cent was noted in planes built for export, according to figures made public today by the Civil Aeronautics Authority. There was an increase of four per cent over the total number of aircraft manufactured in the first nine months of last year.

A total of 2,873 airplanes were produced during the period, as against 2,757 in 1937; 1,313 were for domestic civil use; 944 for delivery to the military services, and 616 were exported to foreign countries. Last year 1,821 were built for domestic civil use; 484 for the military services and 452 were exported.

Monoplanes led biplanes 1,224 to 8 in domestic civil aircraft production this year, the most numerous being the two-place closed land type, of which 9[illegible] were manufactured. A total of 996, or approximately 76 percent of the planes built for domestic civil use, were in the light airplane category which covers all aircraft having power plants of less than 100 horsepower.

In addition to the 2,873 airplanes, 2[illegible] gliders and 4 lighter-than-air craft were produced during the first three quarters of 1938. During the same period last year, 2,757 airplanes, 22 gliders, and 9 lighter-than-air craft were manufactured in this country.

Pilot-Plane Statistics

THERE were 21,526 pilots and 10,0[illegible] aircraft holding active Federal certificates on October 1, 1938, according to an announcement today by the Civil Aeronautics Authority. On October 1, 193[illegible] there were 17,379 certificated pilots and 8,430 certificated aircraft.

The total number of aircraft, certificated and uncertificated, of which the Authority had record on October 1, 193[illegible] was 11,345, while this number on the corresponding day of last year was 10,12[illegible] Uncertificated aircraft (bearing identification marks only) totaled 1,254 on the first of October, 1938.

Among the 21,526 persons holding pilot's certificates on the first of October 1938, were 1,160 airline transport, 6,6[illegible] commercial, 980 limited commercial, 10,197 private, 2,241 solo, and 343 amateur. (The amateur pilots listed here with are those who obtained their ratings prior to November 1, 1937. These ratings are no longer issued.) The certificated pilots included 608 women classified as follows: Commercial, 72; limited commercial, 30; private, 391; solo, 86; and amateur, 29.

If I Were An Operator

by RALPH H. LEWIS

What would you do if you were in the other fellow's boots? Here is an air-minded outsider who has some refreshingly sound ideas on making aviation pay.

EVER since I first became interested in aviation, a little over nine years ago, I have often been tempted with the idea of putting down on paper just what I would do if I were to purchase an airplane or airplanes and go into business as an operator.

Unfortunately—or should I say fortunately—I have never had the opportunity of putting my ideas into practice, so naturally any ideas that appear here are purely my own and are not intended to be offered as sound sales methods but rather as suggestions which I believe would help me if I were to become an operator. . . .

For the past four years I have been employed in the advertising department of one of the largest industrial plants in the middle west. While there I have had the opportunity to observe the advertising methods of a firm, which stands second to none in the advertising field. True, their product is different than selling aviation—but they are selling, and after all every operator must sell aviation if he intends to remain in business. All advertising principles are the same whether you are selling peanuts or locomotives; you must show your prospect that your product is going to help him in some way or you will not make the sale.

I manage to keep connected with the local aviation problem by writing a column each week in one of the newspapers which necessitates my keeping in close contact with all the pilots at our two airports, one of which is municipal and the other private.

Naturally, I am constantly on the alert to give the boys a break with publicity in any manner that I can (mostly in my column) and the boys usually tell me all their troubles, mostly which deal with operating difficulties.

I determined one evening to jot down what I would do if I were in these boys' shoes, trying to make both ends meet each month and eventually build up a nice paying business. Of course, I am using the local situation here in this city (population, 165,000) as my guide, but I have a hunch that the same situation exists in cities of the same size throughout the country.

I know that during the summer months, most operators don't have occasion to "holler" much about operations, as a steady stream of students and passengers are attracted by the fine flying weather, but when old man winter rolls around and the breeze starts to kick up a little, the airports begin to take on a deserted look. Only the old faithfuls come out to carry on their flying and occasionally a few souls will charter a cross-country trip or go for a ride over the city.

The operators, long accustomed to the winter lull, plan accordingly and cut their operating and living expenses to a minimum and spend the bad season getting their equipment ready for the good season and sitting around the stove praying for the spring months to roll around. If any of them entertains a thought that they might "sell" a little aviation during the winter months, it is either kept to themselves or they insist that they haven't the money to properly "sell" their services.

I don't agree with the operator who says he does not have the money to do a little advertising. In the first place, he is in business—and I have seen few, if any, businesses that ever survived if no advertising was done in some manner. The day is past when the student or pas-

A smart operator will sell the woman first. Women who fear flying not only don't fly themselves but influence their men not to do so.

senger will come to the operator and beg him to take their money. The airlines found this out and spend fabulous funds each year advertising their services.

Naturally, being in the advertising business, I believe I am constantly on the alert for some means to successfully "sell" a product. I believe I have some ideas that will help some operators and not one of them involves an expensive cash outlay. However, they are just suggestions and should be treated as such.

Here is what I would do if I were an operator with very little capital trying to "sell" instruction, sight-seeing trips, charter services and so forth to the public in my city:

I would paint the name of my operating firm on every plane I had in service. Most operators are reluctant to do this as they plan to re-sell their plane after it has been in service for a time, and they have learned that it is quite difficult to completely remove the paint once it has been lettered on. To avoid this, I would paint the name of my firm on the rudder or fin. Then if I resold the ship I would recover the fin or rudder at a nominal sum, if necessary. At any rate, I would make sure that my firm name was constantly before the airport public.

I would keep an up-to-date list of every student I had flying and if, at any time, a student or customer was absent from my current list, I would attempt to make it my business to learn why he was not flying. Stamps are cheap and a personal letter or a phone call might go a long way to bringing them back out to the field again. If I had just obtained a new plane, I would invite all my old friends out to try the ship out. What little gas and oil that would be spent in letting them try the ship out would be small, and might bring me revenue from a pilot that likes the flying characteristics of my newer plane.

If at all possible, I would certainly keep the names and addresses of all my charter trip passengers on file and constantly remind them that I had a service to sell them. Every month I would send each one of them an attractive blotter, perhaps with a picture of my ship along with a monthly calendar. I would also see to it that these blotters were sent to the proper persons in the larger industrial plants and offices. Blotters are seldom destroyed and they certainly do not cost much to produce. I would scout around and find out if my city had any young printers that were aviation inclined and let him give me some printing in return for a little flying time.

Christmas is just past, but wouldn't I be clever to work out a nice Christmas card, built around my business and send to each of my customers and potential customers? It would serve to remind them that I was thinking of them and appreciated their past business.

To every student I had that soloed I would present with an attractive log book and pilot license holder with his name printed on the cover. This sounds like it might be expensive, but the cost really is nominal—and every student would be more than anxious to show them to his friends.

Every aviation-minded youth — and grown-ups, too—like souvenirs that advertise aviation. The airlines lose quite a sum of money each year to passengers who take articles from the planes as souvenirs of their trips. The lines now have articles that they gladly give to their passengers for souvenirs. I would make certain that I had some inexpensive item which I could give to souvenir hunters when asked for one. This might be paper matches, windshield stickers showing my type of plane or planes, pencils, scratch pads or some other "different" knick-knack.

Here in my city, we have a model airplane club which use the airports to fly their rubber-powered and gas-powered models. I wouldn't overlook these boys. They would be my best potential students. Already they are learning the fundamentals of flying and are definitely air-minded, which is evident from the pains and time it takes to construct their models. The bigger percentage of these boys is going to fly and I would make sure that I was their friend and that they would fly with me. I would attend a few of their meetings offering help on constructing details. I would make arrangements with a newspaper to co-sponsor a contest each year for these boys. The newspaper would give it plenty of free publicity and because of the fact that I was doing the major share of the work and perhaps offering a prize, I too would come in for quite a bit of free publicity —which is the best kind of publicity you can get.

Then too, the newspaper would naturally become better acquainted with me, and might want to use my services in case of floods, fires or other such disasters.

In my city there is not one high school or junior high school that has any subject relative to aviation. I would certainly go talk to the school heads and sell them the idea of offering a course in aviation, even though it meant only an hour a week. Certainly one hour a week spent with the younger generation would help my cause to no end. If I was lucky, I might be added to the payroll of the school, which would be better still.

I would work a deal with one of the local oil companies in my city, which had 10 or 20 stations. This might involve a free flight course or some similar scheme. Should I be fortunate in working a free flight course, I would benefit both ways—income from the publicity I would receive and the cash revenue from the lucky person when he continued flying, once he had soloed.

I would contribute to national magazines, either by submitting pictures of my equipment, or freak shots of my planes and, if possible, a story of my school or some interesting sidelight. I would remember that my own home town folks read these same national magazines and the fact that I was receiving national publicity might elevate me or my services in their estimation.

I would contact the local radio station and offer to assist them in any way. This might be accomplished by interviewing visiting pilots or broadcasting each week or bi-monthly the aviation highlights of the nation or locally. I would keep them interested and suggest that they make arrangements that, if an occasion ever demanded, they use my plane to re-broadcast via short wave special events as seen from the air. This might be appropriate in case of floods, fires and the like.

I might even suggest to them that arrangements be made to re-broadcast by special recording, of ehe conversation that takes place between the student and the instructor when the student is learning to fly. Plenty has been written about this subject and it seems to me that it could be broadcast very nicely. As a backer for such a program I believe that an oil company would be willing to listen to terms.

I would let the various clubs in my town know that I could get up and address their luncheons and banquets on the subject of aviation. It would be well too, to bear in mind that these same luncheon clubs bring out-of-town speakers in for their meetings and I might get the job of flying their guests in to the city.

I would look around my hangar and pick me out a nice bright lad with a journalistic trend and suggest to him that he write a column each week for a newspaper. He could pick up a little change each week and he could keep my

(*Continued on page 76*)

Position Finder

PILOTS recently began to use the third great contribution to flying safety to appear within recent weeks, when the Stark position finder was placed in operation by Pennsylvania-Central Airlines. Coming on the heels of announcements of an automatic direction finder and an absolute altimeter, the position finder, invented by Capt. Horace Stark, veteran pilot for PCA, complements and makes still more valuable the other two. Roughly, the three developments, all originating independently, tell the airline, commercial and military pilot three essential facts by which he can fly safely: exactly where he is, exactly where he is heading and exactly how high he is. It is manufactured by the Air-Track Manufacturing Corporation, Washington, D. C.

Of the three, the Stark instrument is the simplest and least expensive. It is held on the knee of the pilot and operated with one hand, or it can be attached to the automatic direction finder with which it is closely connected in function. It weighs 20 ounces, is 8½ inches in diameter and an inch thick.

The position finder employs a replaceable transparent map of the radio range and broadcast stations in an area of 520 miles in diameter, covering the route over which the pilot is flying. Twenty-two such maps cover the entire country. Beneath this map are two discs, rotatable and transparent, which bear parallel lines. The pilot tunes in two radio stations on his direction finder, and transfers their compass bearings to the position finder merely by aligning the lines discs. Then he follows the lines which pass through these stations to the point where they intersect, and that point, seen through the map, is his exact position. There are many other uses of the instrument, but this example indicates its simplicity.

The position finder eliminates all mental and written calculations and "paper work" from the job of getting a "fix." Without it, the pilot, even when using the new automatic direction finder, must go through the procedure of triangulation by drawing pencil marks on a paper map.

New Receiver

A NEW radio receiver for airliners which, by means of an audible signal in the pilots' headphones and the lighting of a light on the instrument panel informs the pilot that he has passed over predesignated fixed points on the scheduled airways and over radio range stations at his destinations, now is being installed in the airliners operated by American Airlines. The new receiver operates on 75 megacycles in what is known as the ultra-high frequency band. This band is particularly adapted to this work due to the absence of static of any type.

A Massachusetts Design

AN interesting sport monoplane design was announced in Springfield, Massachusetts, not long ago that appears to have promise from an aeronautical standpoint, at least. It is the Miller *Zeta* shown above.

No concrete figures on the ship are available, though it already has been test-flown. It is powered with an inverted Menasco air-cooled inline engine which is fitted with a metal propeller. The *Zeta* is a low-winged braced monoplane of wood, fabric and steel construction. Wings, tail surfaces and fuselage are fabric-covered. The landing gear is of the split type and pants covers the ship's low-pressure tires.

Accommodation are for two persons, side by side. A detachable hatch covers the cockpit. To date, the ship has not received its Approved Type Certificate from the C. A. A.

The New Cessna

ALTHOUGH the 1939 Cessna shown below is little more than another refinement of the Cessna of the last two or three years, the 1939 model nonetheless is worthy of attention. The customarily excellent Cessna performance has been enhanced a little with its 145 h.p. Warner engine now giving it a cruising speed (at 8,200 ft.) of 151 m.p.h., using 75 per cent of the available power. Top speed is rated at 162 m.p.h. at sea level. Sea level cruising speed is 143 m.p.h.

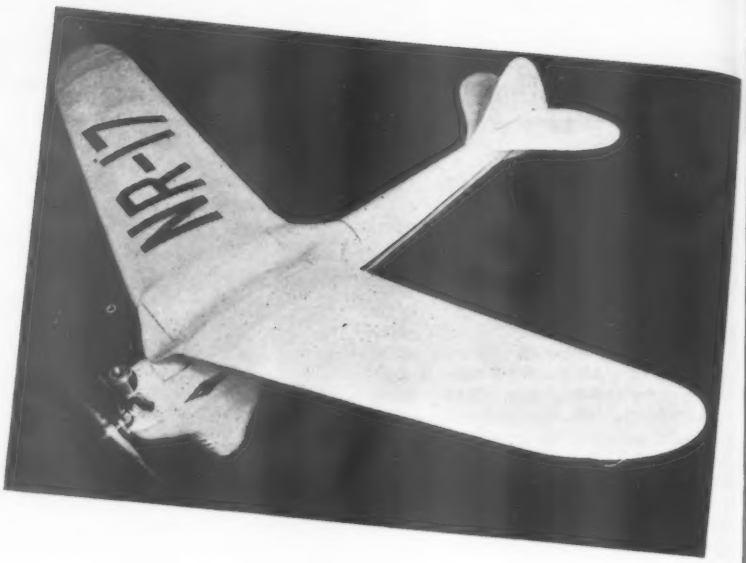
The new Cessna is a particularly "clean" ship, having a cantilever wing and well-streamlined fuselage. Its cantilever landing gear is 87 inches wide, giving the ship favorable handling qualities on the ground. These are added to by the incorporation of a tail wheel lock which the pilot can disengage for taxiing.

Dual controls are installed and are of the stick type. Visibility for both pilot and passengers is excellent, due to the lack of any structural members being in the way. The engine is mounted on rubber bushings. Tankage is provided for 35 gallons of fuel. Inasmuch as the ship gets an estimated 15 miles per gallon fully loaded, that gives it a cruising range up to a maximum of 785 miles. This range can be obtained with the standard and auxiliary tankage of 52½ gallons.

The ship's useful load is approximately 1,000 lbs. Gross weight is 2,350 lbs. Span is 34 ft. 2 in., length is 24 ft. 8 in., and height is seven feet.

Here is a startler for you model fans that should give you many a thrill. An interesting design.

by PAUL W. LINDBERG
Model Editor and Designer



THE CLOUDBUSTER, A ONE-WHEELER

THIS new and different model is most interesting to build and fly. The streamlining is perfect in every detail. The ultra-modern design makes it a beautiful display model as well as a remarkable flyer. The color of this particular model is all red with silver trim and license numbers. In building the model enlarge the plans four times the size shown in the magazine.

Fuselage Construction.

Build up the inner part of fuselage from ⅛ square balsa in the same manner as you would build any rubber- or gas-powered model. After this is completed, all formers are attached in their correct positions. Sand any projecting edges on the formers in order to obtain a smoothly covered fuselage.

The entire fuselage is covered with 1/16" balsa veneer. Do not attempt to cover too large an area as a great number of strips and pieces are required in making the various curves.

After all pieces have been attached, smooth out with sand paper. For strength cover entire fuselage with bamboo paper. Give two or three coats of dope for added strength and smooth finish.

Construction of Wings.

These wings are of the sweep-back type and add remarkably to the ship's stability. After the two wing panels have been made, they are cemented to the root section of fuselage. Spars extend into the center of fuselage and are reinforced with balsa blocks. (See plan, top view.) Elevator and rudder are of both the flat section type so no trouble will be encountered here. Select a good tough grade of balsa in building these two units in order to prevent any warpage when covered.

Please note: Install the landing gear before covering the landing gear housing with balsa veneer. The balsa block directly above the gas tank is removable in order to fill tank with fuel. The block between formers five and six also are removable for the installation of new batteries and balancing the model.

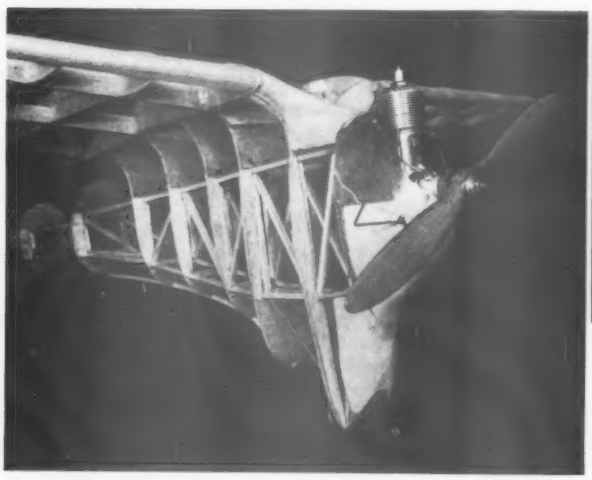
Covering the Model.

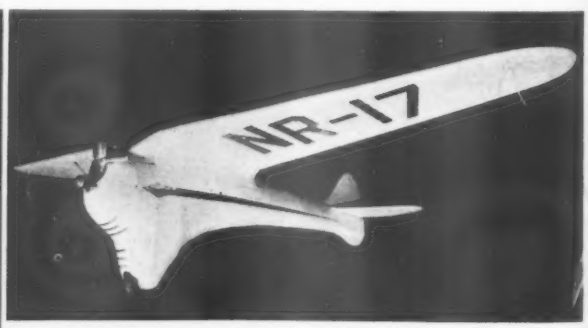
Cover only one wing panel at a time and pin same down upon a flat surface after first applying a coat of water to secure shrinkage. After it has thoroughly dried, remove from flat surface and give from two to three coats of clear dope. Light sandings between each coat for best result. Repeat this operation in other wing panel as well as tail surface.

Final Details.

All small details are clearly explained on the plan. Having finished your model you are now ready to give it a test glide.

(*Continued on page* 79)





Not only is the Cloudbuster a remarkable flyer, it also makes an excellent display model. Color scheme is red with silver.

The Cloudbuster's fuselage and engine-mount construction (left) is noteworthy. This ship is fast because of unusual streamlining.

CLOUDBUSTER
POPULAR AVIATION FEB. 1939
ELEVATOR
ALUM TAB
TEMPLATE FOR ENGINE HOOD
PROP LAYOUT
REMOVABLE HATCH
TRAILING EDGE
SOLDER WIRES TO LUGS ON BACKSIDE OF SWITCH
SIDE VIEW
TOP VIEW
TWO FORMERS EACH OF 18,19,20,21,22,23,24,25,26 REQD
NOTE RIB TEMPLATE SHOWS LOCATIONS OF SLOTS FOR SPARS
WIRING DIAGRAM
RIB K
SIDE VIEW OF WING SKID
FRONT VIEW
LEFT PANEL
RIGHT PANEL
REMOVABLE
THE LINDBERG "HORNET"

"I Flew Coast to Coast for $25.70"

(*Continued from page* 12)

tinued to work excellently until the wind generator went out of commission (again, and for the last time) somewhere between Nashville and Louisville.

At El Paso I flew over a smelter and noted from its smoke that the wind had shifted to become a tail wind for me. This was encouraging, although my cruising speed already had started to better for the leg from Tucson to El Paso figured up to an average of 86.3 m.p.h.

With the exception of such routine things as checking landmarks on my maps, getting weather information over my one-way radio, eating a candy bar or drinking some milk, I did little but sit. One of my duties was the pumping of gasoline out of the auxiliary tank up into the main tank from whence came the supply to the engine. This I could do with a special electric pump installed for the purpose. However, when the generator went dead for the last time I had to continue the flight by using a hand wobble pump. At first, this pumping had to be done 10 minutes out of every hour. Later, as the fuel consumption dropped, the required pumping time took just five minutes each hour. At no time did I let the main tank get more than half empty.

With Guadalupe Pass just ahead, I passed towering El Capitan Mountain at about sunset. Climbing to 7,500 feet, I went through the Pass just as it got dark. By that time, the airways beacons had been turned on. The weather was so clear I could see six beacons ahead, which is about 60 miles. With conditions like that, I had little to do outside of fly from beacon to beacon along the airway.

The route I flew was that used by American Airlines. Officials and other employes of that airline helped me tremendously throughout the flight. American Airlines weather men compiled special weather reports and relayed them to me by radio. They kept me advised as to conditions ahead.

My next check point was Fort Worth and, aside from checking the Aeronca's performance every so often, I had nothing to do but follow the beacons to Fort Worth. At 11:30 p. m., E.S.T., I flew over Fort Worth airport at 1,500 feet. Just as I passed over the field I heard a special weather report come through my earphones which told me I still had favorable conditions ahead. I was interested largely in the winds aloft, although I was prepared to fly on instruments in case the weather clouded up on me.

From Forth Worth I headed for Texarkana, 195 miles away. Again I had little to do but sit and watch the beacons. I drank some milk and ate a slice of bread. One thing at which I marveled throughout the flight was the steady beat of the engine. Not once did it falter in the slightest, although it ran more than a solid day without letting down a bit.

Passing over Texarkana at 1:45 a. m., E.S.T., I checked off my 16th hour of flying. Yet, I didn't feel the least bit tired or sleepy. Now, too, time began to pass a little faster because towns and other check points began to appear more often than in the more thinly populated west. On top of that I began to feel a little better when I discovered I had picked a light tail wind.

It seems to me that time passes much faster at night while flying. I guess it's because every beacon and the lights of even the smallest towns stand out so prominently. Anyway, the hop from Texarkana to Little Rock, Arkansas, didn't seem at all monotonous although it was quite uneventful. That was a 135-mile hop between check points.

Passing over Little Rock, I set a course for Memphis, 130 miles ahead. It still was pitch black out, although visibility was excellent and I could still follow the string of airway beacons. I was flying at 4,000 feet between Little Rock and Memphis when I spotted a large forest fire a little to one side of my course. At about the same time the visibility started to haze up. I thought at first it was because of the fire, but the haze continued far from the fire. I drank some of the water and milk and nibbled a candy bar just before checking in over Memphis.

All the while it kept getting hazier until my visibility was cut down to just two airway beacons. Just outside of Memphis I discovered one of the beacons had gone out and I had to set a compass course for the next one. Nashville, my next check point, was 200 miles ahead.

I have been asked "how it felt" to sit in one little seat for so long. Well, I didn't just sit all that time; there was a metal bar running across the top of the cabin and I'd "chin myself" on it every so often. Then, I could stretch fairly easily, for the ship flew herself a lot of the way. . . .

The weather kept getting hazier. Visibility ahead was quite restricted, though I still could see lights that passed directly beneath. As the visibility kept getting steadily worse, I switched on the compass light and flew by that instrument for the next half hour. It still was very dark. Then, two hours and 10 minutes out of Memphis, I made out the lights of Nashville, Tennessee. This was to be my last important check point, for I had to choose one of three alternate routes on into New York, depending on the weather ahead.

I flew fairly low over the Nashville airport so as to make sure the attendants on duty at that early hour would know I had arrived. Sure enough, just as I flew by I heard their special weather report intended for me come through my earphones. I breathed more freely on hearing that all three routes were flyable.

On arriving at Nashville I was to decide whether I'd fly on to New York by way of Cincinnati and Pittsburgh, by way of Chattanooga (in case of particularly bad weather) or via Knoxville, Roanoke and Washington. However, inasmuch as all three routes were available, I decided on that via Cincinnati because I wanted to fly over the Aeronca factory at Lunken airport. So I set my course for Louisville, 156 miles ahead.

It started to get light between Nashville and Louisville. But, the lighter the sky got, the hazier it seemed to be. In fact, when my calculations told me I was supposed to be at Louisville, I couldn't see any part of the city because of the thick ground fog. Then, when I tried to raise Louisville airport for a weather check, I found that my radio was completely useless because of that faulty wind generator which had gone out of commission again. From there on I was definitely on my own. It was up to me to find my way over the rest of the course by dead reckoning.

Picking up the Ohio River just outside of Louisville, I followed it 95 miles to Cincinnati where, at 9:11 a.m., E.S.T., I zoomed over the Aeronca factory. It was a great thrill to see all the Aeronca people out on the airport to see me pass. They told me later they'd had a man on lookout at Lunken airport since 5 a.m.

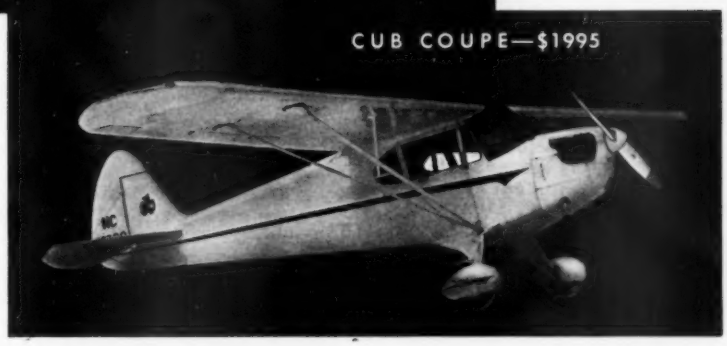
After zooming the airport at about 100 feet, I climbed back to 3,000 feet and headed for Columbus, 105 miles away. Again, the flight became uneventful. Over Columbus at 10:21 a.m., I climbed to 7,000 feet and headed for Pittsburgh. By then I was getting a little excited because I was on the "home stretch". I had only one thought in mind after leaving Cincinnati, and that was getting to New York.

I identified Pittsburgh like all pilots do—by the extreme lack of visibility. The huge black blob on the horizon definitely identified that city. I wasn't particularly interested in that phase of the trip by that time, though, because I had plenty of rivers, railroads and towns to check on my map. As I crossed the Allegheny Mountains I ran into a full-fledged blizzard. I flew on instruments for a while, keeping my compass course for New York city. Then, through the thick haze, I saw a fairly large airport directly below. I circled the field at 1,500 feet several times but could not identify the field except by the large name BENDIX laid out on the ground. I couldn't find a Bendix airport listed on my airways map. Just then I saw another Aeronca taking off so I waited for him. The pilot pulled up alongside and waved at me, then headed east. I flew up beside him and together we flew out over what turned out to be Long Island Sound and then on to Roosevelt Field, my destination. I discovered later that the Bendix field actually was the old Teterboro airport in New Jersey.

On November 30 at 4:18 p.m., E.S.T., I landed in snow and slush on Roosevelt Field, 30 hours and 47 minutes from my warm, sunshiny starting point in Los Angeles. I didn't even have time to get out of the ship before newsreel and newspaper cameramen pounced on me. Then an N.A.A. representative ripped the patch off the bottom of the ship's fuselage and removed the barograph. A few

(*Continued on page* 89)

Look At All 3



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Check Yourself Out

(*Continued from page* 58)

ways for many people, including myself, to learn new facts, is to write them down, so the first evening was spent in the cockpit with a writing pad on my lap, diagramming everything in sight, and frequently calling on Henry for repeated explanations of what, where, how, and why. That is how I found out that there were 186 things to move or to watch in that cockpit. The original arrangement had been especially laid out for this particular airplane and had later been added to and changed in small respects so that there was no complete blueprint available to me at that time. Anyway it makes it easier to hold in your mind when you have to draw the pictures yourself. A few days later I was able to diagram sections of the instrument board or the overhead control panel or the multifarious radio switches, from memory, even to the order, left to right, on the light switch panel. I no longer looked blank when Henry asked to have the synchronizer indicator turned on. (Wish I could still remember it all; I'll have to get out those old diagrams again one of these days!)

One of the improvements in technique which we were able to make after I became a little familiar with the new ship was a standardized cockpit procedure which we adopted from Pan American in order to insure a double check on all the important variables before taking off or landing. The following commands are now verbally passed from pilot to flight mechanic and back before takeoff:

"Ready for land (or water) takeoff."
"Wheels down (or up)."
"Tailwheel locked."
"Hatches secured."
"Standard carburetor."
"Full rich."
"2250."
"Zero flap."

The same routine is gone through before landing, with the omission of "Hatches secured" and the addition of "Carburetor heat off." Also, no changes of automatic mixture settings, prop revolutions, throttle positions, or landing gear or flap positions is made by the flight mechanic without the verbal order being repeated. At first glance this may seem like a lot of unnecessary hocus pocus, but we have not yet put her down in the middle of Roosevelt Field in a smooth keel landing.

By the end of the second day the S-43 cockpit felt just like home and we were ready to do loops, spins and rolls if that would have done any good. As a matter of fact, our most serious omission at the time was that of night practice, but as I had been assured that no night flying was contemplated, this was postponed for a few weeks, until we found ourselves temporarily based on the airport and could make a dozen night landings without having to taxi up and down channels and pick up buoys and attach slings. The Bureau of Air Commerce rating test of half an hour, which followed a day or two later turned out to be duck soup after this self-imposed program, and when I was asked to do a spot landing for the inspector it was reassuring to remember that the last two or three had been reasonably close to the mark.

As is so often the case, the first landings both on water and on land, were so smooth and easy that the whole thing immediately looked absurdly simple. Then we began to bounce and, before long, I was wondering how in the world anybody could get such a ship on the ground without dropping her five feet, or galloping, or generally messing things up. It has taken several months of further experimentation to discover the precise speed, angle of attack, and r.p.m. necessary to blend her to the surface of the water so that the passengers cannot tell they have landed until we drop down off the step, and we know we will never be good enough to get those results consistently on an airport, with even the smoothest runway.

It is unfortunate that we have so few opportunities in actual service flying to practice emergency maneuvers. Passengers somehow do not appreciate the niceties of "360's" with their necessary steep banks and thousand-foot-a-minute descents, and even without passengers, it is hard for a pilot to practice on a familiar airport where overshooting, even an intentional simulated overshooting, is likely to be greeted with hoots of derision from his friends on the ground. It would be a good thing for many of us who are flying professionally, and therefore have reputations for sane conservative flying to live up to, to sneak away with our ships to backwoods airports two or three times a year and brush up on all those little knacks of emergency flying which we expect to see students practicing at the home field, but are somehow ashamed to admit that we cannot always do perfectly without practice.

END

Smilin' Jack

(*Continued from page* 18)

started taking flying lessons all over again. Wally Jackson, at Roosevelt Field, was his instructor. Jackson flew Mosley in a dual control job for seven and a half hours.

Then one bright day, Jackson told the jam artist: "Okay, fellow, take it off."

It was his solo.

"And that was the nuts," relates Mosley. "I was scared when I lifted the tail. I was still scared when I pulled up the nose. But I wasn't more than a hundred feet off the ground before everything was all right.

"I actually felt that fear go. There I was, flying solo. I could go up or down or around, do anything I liked, and I wasn't scared. Landing was easy. It's all been easy ever since."

Mosley keeps himself in just as good condition as his Smilin' Jack. He swims, golfs and punches a bag. He has to. He spends from 35 to 40 hours a week over the drawing board, and at least 20 more writing plots and dialogue. He must keep ten weeks ahead of publication. That means that once in a while he has to put in 16 or 20 hours straight, working in his study. Those are the times when he gets inspirations. Maybe you thought a jam artist's life was an easy one, but you should hang around Smilin' Jack. He will disillusion you.

"Inspiration is everything in this business," Zack explains. "If your ideas are routine, your strips are routine. That's no good. People live routine lives; what they want is adventure.

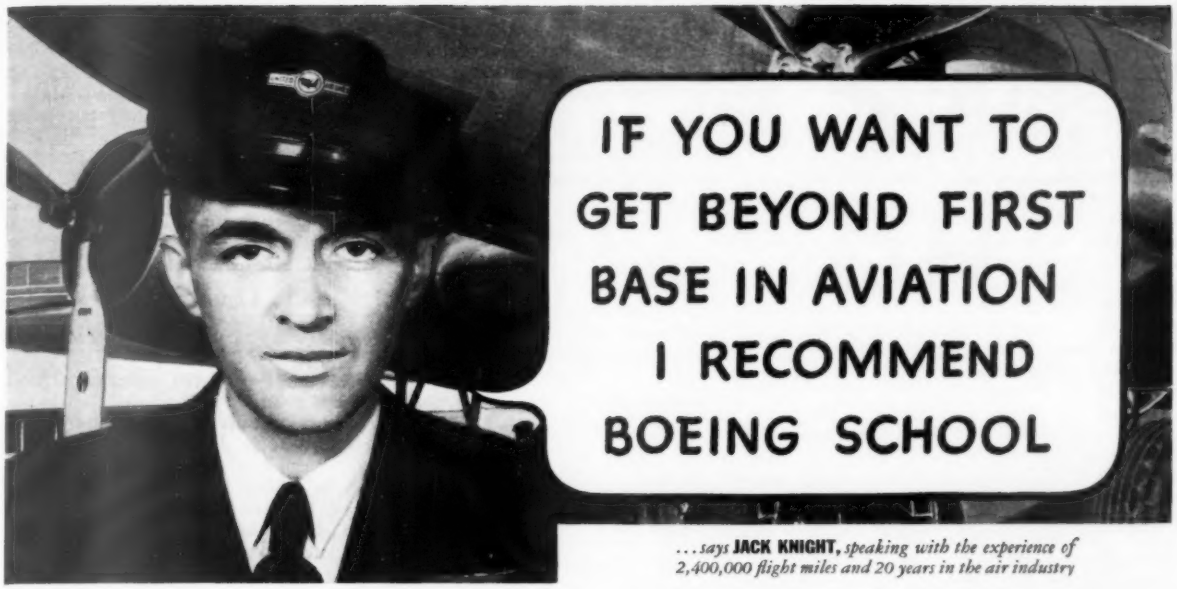
"Captain Patterson keeps a close eye on Jack. We go into a huddle every two weeks over the drawings and plot."

Zack has another boss. Her name is Mary, and she is an inspiration too. Mary Gale hails from Clear Lake, Wis., and has been married to Mosley since 1932. Remember Gale, the lady spy who practically ruined Jack? Well, that's where she got her name.

Mrs. Mosley didn't mind. You see, the lady spy was very beautiful. She had to be; Zack used his wife as the model.

Mary is as devoted to Smilin' Jack as her husband. If you want proof, the Mosleys placed in the cornerstone of the "House That Smilin' Jack Built" the first drawing that Zack ever made of the fellow who provides their bread and butter. Visitors to Sands Point can still see it there, glassed in.

END



. . . says **JACK KNIGHT,** *speaking with the experience of 2,400,000 flight miles and 20 years in the air industry*

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(November 1937—October 1938)

Months	*Graduates*	*Placements*	*No. Co's Employing Graduates*
1937			
November	2	2	2
December	29	7	3
1938			
January	7	14	6
February	1	9	7
March	40	16	6
April	6	13	3
May	6	12	6
June	30	5	4
July	4	8	4
August	2	3	3
September	29	12	10
October	1	6	5
TOTAL	157	107	28

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Pacific to Atlantic

(*Continued from page 30*)

traffic men know in advance the schedule of cruises. They have their calendar marked right now to show them just what their busy days are going to be all through the winter.

When a cruise ship is 48 hours or so away they begin to get reservation requests by radio from the cruise director or purser (or if they don't they radio out for them—and get them). The cruise director takes the reservations in the order he gets them—first come first served—and books his passengers, subject to confirmation by Panama Airways.

If the ship is due in Cristobal early enough so that the first flight can leave the airport at 7:40, his first 13 bookings will be for Trip No. 1, and then he will go on booking additional ships until he has 36 scheduled if he can get that many. (As a rule there will be 15 or 20 round trips booked.) The schedule which Pan American Airways has set up and provided to cruise directors lists trips numbered from 1 to 36 and departing at 15-minute intervals from 7:40 a. m. to 5:45 p. m., with other trips numbered from 37 to 72 representing the return flights from Panama to Cristobal. If the ship is not to arrive in time for Trip No. 1, the cruise director starts with Number 5, or whatever one will be departing at the proper time. The trip numbers are provided to cruise directors as a convenience, to save wordage in radio communication. If he starts his reservations with Trip 6, the first five are not flown on that particular day (unless they are requested by another cruise ship coming in on the same day).

Receiving these requests Panama Airways makes certain that it has sufficient airplanes on the line to accommodate all the passengers, mobilizes taxicabs, and then its representatives meet the ship, get in touch with the passengers, give them their tickets and direct them to taxicabs if they are to leave immediately, or tell them where to get their cabs if they are not to fly until later in the day.

It is about four miles from the dock to France Field, and the plane is ready and waiting. Almost as soon as the ship is in the air the fun begins. The Canal is just across the way, and the first big thing that looms into sight is Gatun Locks, probably with a big coast-wise liner in the process of going through. Then across Gatun Lake, along the channel which has been prepared and marked as a part of the Canal route, to Barro Colorado Island.

From here on the route is over land again. Underneath is a thick mat of tropical foliage sharply divided by the water of the Canal, and with a thinner open strip off to the left where the railroad comes through. Halfway along the route the passengers look down at Culebra Cut, a gigantic gash right through the Continental Divide, and a feat of modern civil engineering which is worth traveling far to see. Then past Pedro Miguel Lock and Miraflores Lock to the airport at Balboa and the only trouble with the whole thing is that it is so brief.

Toward the end of the season last year, Panama Airways had as a passenger an unassuming little man who was properly thrilled by this busy operation along the Canal, but who was able to be very superior about the view of the Canal from the air. Unlike most of Panama Airways passengers—about 60 per cent of whom are making their first flights—this particular passenger was an old hand at it. In fact, he was the first man ever to fly the Canal route. Back in 1913, Robert G. Fowler flew his tractor seaplane, built by himself, from Balboa to Cristobal. With him went a motion picture operator who put a record of the journey on celluloid. Fowler afterward lectured up and down the United States about his trip and showed his movies, and also nearly got into jail for betraying military secrets by showing pictures of the Canal. But the government finally decided that he hadn't betrayed any secrets after all, he got tired of giving the lecture and dropped out of sight for years, until the 25th anniversary of his famous flight when he went back to Panama to retrace it via scheduled airline.

Some change. A plane every 15 minutes. A thousand passengers a month in the busy season. Old Bob Fowler thought it was pretty fine, but nothing like the old days. After finishing his anniversary flight, he hopped a Pan American Airways plane to fly up through Central America and Mexico and back to California, to settle down and match the recollections of his 1938 flight with those of 1913. He probably prefers the earlier one, but not us. We'll take that 29-minute coast-to-coast flight in a multi-engine, multiple crew airplane for ours. END

Love Birds

(*Continued from page 46*)

make money on the volume. That's worked pretty well.

There has been a light side to the business, too. Like anyone else, Bob has learned a lot through mistakes, and he's been lucky. He's landed on lakes, beaches, golf courses, and polo fields, and other places where he found out later on that he had no business to be. He discovered that a beach on which one has landed safely many times can become soft as a cereal without changing its appearance at all. He found it was much shorter from tee to green in a Stearman than it seemed when you were pushing a golf ball. That was an expensive experiment, but most of them cost more in wounded pride than in cash.

Bob says Nancy never rides him about that trial and error procedure, but he will admit she has eyed him rather queerly at times. He's had his innings too, he contends, and she concedes he's right. But Bob flies with the best of them as a lieutenant in the local detachment of the Army Air Corps reserve, and Nancy has flown them all, from gliders to Douglases. Best of all, they like the annual seaplane cruise of the Aviation Country Club on Long Island.

Bob hopes that this year will mean 7,000 revenue flying hours for his firm. Nancy hopes for good luck for the Gwinn company, of which she is an official. They haven't found the pot of gold yet, but they've had a lot of fun flying around the rainbow.

END

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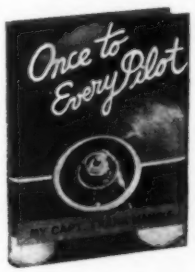

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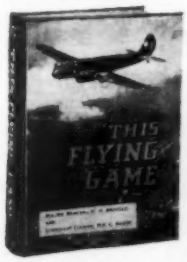

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Remarkable Fellow

(*Continued from page 56*)

equator, over Lake Victoria Nyanza, through "darkest Africa" to Kenya, Tanganyika, Rhodesia and down through the Transvaal to Johannesburg. The course carried on through Kimberly, the location of the largest man-made hole on earth and the great diamond center, across the Karoo desert to Capetown. On his four-day flights, he went from the humid equator to the winter sports of Capetown. flew regularly over territory where a crash might mean death in impenetrable jungles or starvation and thirst on vast deserts and plains.

However, Richardson neither died in a jungle nor starved to death on a plain, and he was assigned three years ago as first officer of the DH-86 *Dorado,* which was to be used to survey a proposed new route from Penang to Hongkong. The route lay across the Malay Peninsula and the Gulf of Siam—a considerable body of water—from Penang, in the Malay States, to Saigon, in French Indo-China. From there it proceeded over "very rough country" to Hue, or Tourane, in northern Indo-China, finally reaching Hongkong by way of Fort Bayard.

The survey flights were carried out regularly over a period of seven months. New airdomes were under construction and much of the going was pretty tough. The officers aboard *Dorado* made some interesting discoveries on those flights, notably a "wind-reversal" which they discovered while passing over Hainan Island, on the stretch between Indo-China and Hongkong. During the Northeast monsoon period, they found that while the wind was very strong from the Northeast on the surface, at altitudes over 8,000 feet it blew strongly and steadily from the *Southwest.* This was important; on the scheduled commercial flights to come later, it was well to know that the airplane would be helped along by a tail wind if it climbed high, rather than having to buck a headwind near the surface.

This over-water flying, and that he was to experience later on, led Richardson to invent a device that may be of vast practical importance in the future. In brief, it is an automatic course and position recorder, probably similar to the "mechanical navigator" which the U. S. Army Corps sent along to be tested on Howard Hughes flight around the world. On the Richardson instrument, now in the hands of the Air Ministry for consideration, known factors, such as the ship's air speed and time aloft, the compass reading and the drift, are recorded by a member of the crew, and in seconds the airplane's position in latitude and longitude is calculated *automatically* and indicated on dials in the cockpit.

The value of a device that works out position by dead reckoning mechanically is obviously immeasureable. Undoubtedly the Richardson mechanical navigator, which is a practical instrument that really works, will be of tremendous importance to all over-ocean flyers, and will give him considerable fame in his profession,

From the personal standpoint, however, the most important milestone in his career (which gives a fair illustration of the speed with which he travels toward an objective) was reached, not with anything so prosaic as an invention, but when he and his fellow survey pilot flew into Hongkong and were received joyfully as the first air link of that British colony with "home."

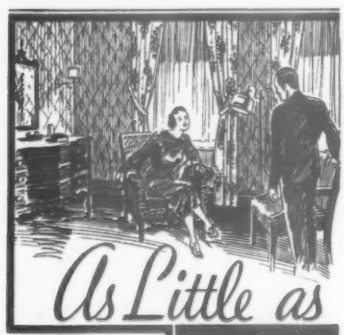
To his immense good fortune, a guest at one of the many lavish affairs given in the flyers' honor was Miss Elizabeth Marion Gibson, a daughter of the Hon. Edward Gibson, who had just arrived from her home in England to spend a six months' vacation in China. Richardson disrupted *those* plans in short order. Miss Gibson cancelled her vacation and returned to England on the same ship on which she had just arrived in Hongkong. Richardson completed his survey flights, and a month after Miss Gibson arrived back home, from which she had left so recently with no idea of the future in store for her, they were married in Kensington, and flew (for a change, no doubt) to Brussels for their honeymoon. Today they live in Warwick, Bermuda.

Together with Captain Cumming, Capt. Griffith J. Powell, (now director in Bermuda for Imperial), and three other senior pilots, Richardson was appointed to the first course organized for the qualification of first-class air navigators by Imperial. The International Aeronautical Convention required such qualification for one pilot on each aircraft flying distances over the high seas greater than 615 miles. After six months of intensive study, the little class took and passed a five-day Air Ministry examination, and became the first half-dozen British pilots to qualify as first class air navigators. Even today there are only approximately 18 such men.

From there, the six were assigned to the Short Brothers' plant in Rochester, England, where the new Empire flying boats were being built, and to the Bristol works, where the engines were under construction, to become familiar with all the details of the aircraft they were to fly. Just as Pan Americans future transatlantic officers today are undergoing familiarization courses on the new *Atlantic Clippers* at the Boeing factory, the British pilots had to know all about their future equipment. Then Richardson was ordered to Bermuda.

He arrived in the little group of islands in February, 1937. *Cavalier* was already there—having been sent out from England aboard a steamship in the largest packing case ever exported from Great Britain—and was nearly assembled. With Captain William Armstrong, the first director of Imperials operations in this part of the world, he test flew the ship and, on May 25 of that year, he and Captain Cumming made the historic first flight from Bermuda to the United States.

It was the first time in history that a British commercial airplane had made a regular scheduled trip from British soil to the United States. Since then, Richardson has been shuttling back and forth regularly between this country and the tiny little vacation paradise. In the late fall and winter, *Cavalier* flies between Baltimore and Bermuda; in the summer and spring, the American base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is at Port Washington. A very high percentage of scheduled flights has been carried out, and there have been no mishaps. Not a passenger has been injured at any time, either in Imperial's or Pan American's operations.

Since he has been in this part of the world, Richardson has played an important part in the establishment of several records by his line, in addition to setting one of his own for the number of trips made. For instance, last April he was navigator and copilot of *Cavalier* when it successfully accomplished the first round trip flight between the United States and Bermuda in one day—a trip which, by the way, I had the privilege of making.

We had breakfast in Baltimore early one Friday morning, and took off at dawn from the harbor off the Baltimore Airport. A few hours later we were in Bermuda, where I had lunch and a swim at Hamilton while the ship was being cleaned and passengers were taken aboard. An hour after our arrival, we were back in the air again, and had dinner that night in Baltimore. We had covered 1,600 miles in less than 12 hours, and between our arrival back in Baltimore and our dinner at the Belvedere Hotel, Richardson took and passed his semi-annual physical examination! The feat has been repeated several times since, but it aroused considerable public amazement the first time.

Seeking to learn what sort of people pilots are, and what they've done, is a job that only a hardened, patient fact-gatherer should undertake. They're a most modest breed by nature, and Rich, as he is known to the many friends he has made in this country, combines the extreme modesty of the average pilot with the natural reticence of an Englishman on his guard. For this reason, it took more than a year for me to learn, with the able assistance of Paul Bewshea, Imperial's commercial manager in the States, that he is both a flight lieutenant in the Reserve of Air Force Officers and a lieutenant-commander, retired, in the Royal Naval Reserve. He is the only man in the British Empire to hold both commissions.

Similarly, with Mr. Bewshea helping me to find out what and who these British pilots who were flying into our own backyard actually were, I discovered after patient cross-examination that Rich is the only British pilot to hold the Air Ministry's commercial pilot's license, first class navigator's license, radio telegraphy license, engineers and riggers license, and the Board of Trade's master mariner's certificate.

Which is a lot of license.

END

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If I were An Operator

(*Continued from page 64*)

public reminded all year round that aviation was still very much alive. Of course, I would see to it that I go my share of "free" publicity.

I would contact the larger industrial plants in my city and see if there was enough air-minded employees to warrant starting a flying club. Of course, my idea would be to sell them a plane of their own and that they could get their flying time at a minimum cost. I would stress lightplane training and then be on hand when some of the pilots from the club "graduated" to heavier planes. Naturally I would make a profit from selling the ship, from teaching them to fly their plane as well as servicing it.

I would constantly encourage the "camera bugs" that came out to the airport. I would suggest to them the different shots they could get from the air and I would either purchase the better shots and use them for advertising purposes, or I would start a space on a vacant wall where the boys could tack their pictures, giving them proper credit, of course. This would be giving them a break and would be helping me too, as the word would spread around among the camera boys and they would be seeking my services for their aerial shots.

I would make arrangements to show my newest plane at the yearly automobile show that most cities have once a year. I would be on hand to let the public inspect the ship, invite them to sit in the seats, inspect the instruments and feel the controls. I would try to get financial help from the manufacturer of the plane on this, however, as the expense of dismantling the ship and making arrangements to transport it and reassemble it would be too much for me. I wouldn't worry about being charged for the rental of my space in the building, however, as the airplane would be an attraction for the automobile boys to capitalize on in their pre-show advertising.

If I happened to have a spare motor around I would contact some department store and make arrangements to display parts of the motor along with a display of precision tools or something similar which the department store had to sell.

If I didn't have any girl students, I would make an effort to obtain a few. Pictures of girls are always good publicity and then too the fact that a feminine creature is a pilot goes a long way in breaking down fear in other feminine —as well as masculine—minds.

I would suggest to the newspaper that they run in their farm section of their paper an air shot of the more attractive and prosperous farms in their circulation district. The angle here would be if the farmer recognized his farm, if he would come to the newspaper office or write in, he would receive an enlarged photo of his farm suitable for framing. The newspaper would profit by goodwill and personal contact and, of course, I would receive the credit line in addition to a fee for taking the pictures.

These are just a few of the angles I would attempt to use if I were to begin operating. Perhaps these suggestions would not apply in your case. If not, perhaps they have started you to thinking of the manner in which you can "sell" your services to your community.

In closing let me say that if there is *any* advertising or publicity method within your means that you can use (and there *is*)—go to it!

END

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Strike!

(*Continued from page 54*)

ver to throw off their aim. Shotgun pellets pattered harmlessly off the taut fabric of the planes' wings or fuselages like rain off a duck's back but the high-powered rifle bullets riddled the planes and cargoes, some of which were badly damaged.

The sniping became so dangerous at the Niles plant that, for a time, the day flights had to be called off. Powerful searchlights were then installed on top of the plant and supplies were dropped only at night.

Flying a load of Swiss cheese into Warren plant, Pilot O'Malley was caught in a heavy cross fire and his ship was riddled with bullet holes. When he landed on the improvised runway, he found some bullets had hit the cheese and mushroomed, tearing out great chunks of the cheeses.

"So," he commented, later, "I learned how the holes in Swiss cheese are made."

Pilot Kirk, the fellow who flew on a student's permit, had a very narrow escape. Kirk was flying a Hisso-powered Waco biplane, when a sniper's bullet hit and tore loose an exhaust manifold. The manifold, falling against the ship's fabric, set fire to the ship as he flew over Warren. And the flames threatened to spread all over the ship, even to its gasoline tanks, as more bullets plopped through the wings. Hundreds of pairs of hostile eyes, Kirk knew, were fixed upon his wounded ship.

"I wonder if" . . . . he mumbled as he throttled his engine and started a glide toward the Warren airport where he knew a crowd of strikers, armed with guns and clubs, awaited any of the food-flying pilots who might land.

He dropped in to a quick landing as Pilot Groat, who then was flying from that airport, sensed the trouble and dashed out into the field to the stricken ship. Groat tore loose a chunk of the flaming fabric—just as the mob of angry strikers, brandishing pick handles and stones, rushed across the field.

"Get out, quick," advised Groat, dropping flat on the ground under the wing, as Kirk rammed his throttle wide open. The Hisso caught, roared and the Waco lumbered down the field as a shower of stones and clubs drummed against the taut fabric of the wings and tail group, a few even breaking the fabric.

Kirk later landed at Cleveland with one of the clubs still sticking through the fabric of his tail group.

The ships frequently came back to the Cleveland base, riddled with bullet holes, which were neatly patched later with tiny bits of fabric. The bullets made tiny holes on the underside of the wings but tore out great chunks of fabric on the top, permitting the air to enter and threatening to strip the wings.

Once a Cleveland newspaper man, Anthony C. DeCola of the Cleveland *Press*, twitted a group of the pilots about the sniping:

"I think you're trying to kid us."

Kirk promptly offered to fly him over the picket lines. The offer was accepted—and the Waco came back with more holes than usual. One bullet even struck the metal seat under DeCola but, fortunately, glanced off. Another bullet tore through Kirk's instrument panel and Kirk even felt the hot lead.

The pilots learned to spot the snipers, who, hard to find by ground searchers, were plainly visible from the air and they often returned the compliment by hurling stones or steel bolts at the snipers. They reported the snipers' hiding places to civil authorities and some were arrested.

One pilot was taking off at the Cleveland base and, as he skimmed over the road, a sniper suddenly pointed a shotgun and let drive, pointblank, at the plane. These pellets didn't rain off, but riddled the ship. The startled pilot, quickly recovering control and chased the man who dived into a clump of woods where he was captured.

Frank Flynn, district manager of the Warren and Niles plant, is a devout church member, who rarely misses his Sunday services, no matter the emergency. Flynn preferred to attend services at his church rather than those within the plant, so one Sunday morning, he left the plant, meeting no resistance.

He attended church, then returned to the plant. But the pickets barred the way. No arguments would prevail upon them to change their minds.

"Why don't you fly in?" suggested one derisively, "on top of a load of canned beans?"

"By George, I will," returned Flynn promptly. He went to Cleveland, boarded one of the planes and within 20 minutes was landed safely inside the mill yard.

And from then he used the planes regularly to fly to his church each Sunday or to attend conferences with other Republic officials.

A tricky, dangerous job, that food flying job. One airline pilot volunteered one day, took out a load of food—and came back an hour later with his plane riddled with bullet holes and its landing gear festooned with small tree branches.

"It's too much for me," he stormed. "I quit."

Most of the others lasted longer with Kirk the student probably piling up more hours than any other. He flew the whole 28 days—four or five to eight hours each day.

One of the closest calls was experienced by Pilot O'Malley while he was dropping food into the Niles plant from a Waco cabin biplane—the flagship of the fleet. A few feet above the ground, with the motor throttled and the plant in front of him, the motor quit suddenly. A crash appeared imminent.

O'Malley, with lightning quickness, jumped on the starter rather than to attempt maneuvering in a forced landing. The motor caught the first time and O'Malley dragged the plane over the plant by inches.

The food flyers were hit hard when they had the fight nearly won. The Cleveland municipal authorities clamped down, forcing them to abandon the Cleveland base. They then moved to an airport at Ashland, Ohio, about 100 miles from their destinations.

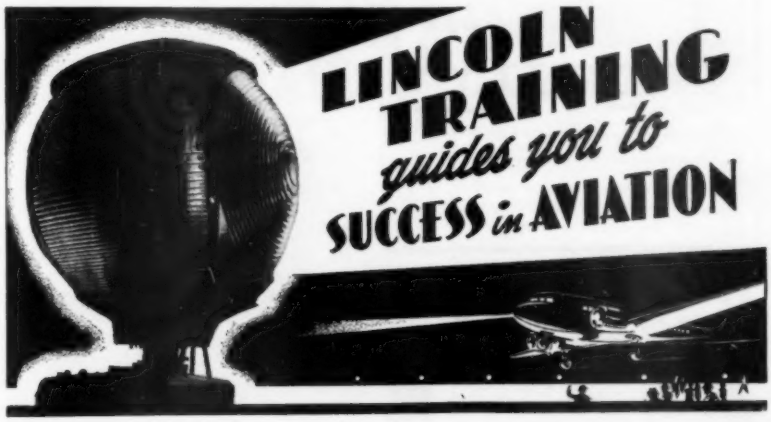
All in all, that was an expensive month for Republic Steel Corporation which disclosed its air expenditures to the La-Follette Civil Liberties Investigating Committee of the U. S. Senate recently.

It reported the airplanes cost $54,350 of which $38,725 went for buying eight ships. Airport expense was $44,634, it reported to the committee, while $99,473 was spent for the materials shipped by the planes, including $46,043 for groseries and $28,784 for meats.

The spectacular success of the airplanes in the strike made of Republic officials air enthusiasts and soon afterward Republic bought a twin-engined Lockheed "executive" plane for the use of Chairman Girdler and other executives. Pilot Mood, one of the food flyers, was kept on as the co-pilot of the Lockheed.

The Lockheed, berthed alone in one large hangar at Cleveland airport, is used frequently by the Republic officials on their hurried trips to the various Republic plants and offices—New York, Chicago, Birmingham, and other points. Now, it is reported, the company is even equipping its branch offices with airplanes—Stinsons.

END



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Mr. Bennett Has a Plan

(*Continued from page* 19)

"Why not let the government buy planes and allot them to flying clubs? That is a question worthy of an answer. Because there would be the problem of which planes to buy, whom to allot them to and many other problems.

"Under the proposed plan much additional money would be spent by flyers. The problem of which plane to buy would be left to them, thereby providing the only method of satisfying them completely. If the government bought the planes they would be operating in direct competition to present airport operators. My plan enables those operators already set up to benefit along with newly established training centers. The present system of airplane sales and distribution would not be disturbed and all manufacturers would have an equal opportunity to participate.

"It has been asked how this plan can aid the establishment of airports. In almost every community land suitable for a flying field can be rented for from $15 to $50 a month. Such a site, plus an inexpensive home-made hangar, would prove a nucleus on which an extensive aviation center might grow. In most every community you will find 15 to 50 people eager to enroll in such a movement. They will be the pioneers who will lead hundreds of others into the air to make America a nation of flyers!

"Fifteen or more people are enough to establish and support an ordinary country airport which would be entirely adequate for the purposes of the plan," Bennett believes.

"It is admitted $100 is not enough to adequately train a military pilot. But it will teach him the rudiments of flying and surmount that obstacle of getting him into the air and teaching him to fly; to get his pilot's license. It will save time in mobilizing a flying force for advanced training and reduce the time necessary to produce a finished military pilot.

"It will make America air conscious with a vengeance. If thousands of new pilots come into existence there is certain to be a percentage of natural flyers who have inherent abilities which will be developed. Many will want to join the Army and Navy flying corps. From these the best can be selected and a new source of pilot material made available. England has undertaken to pay for flight training of citizens for the same purpose. Within a few weeks after public announcement, over 23,000 persons applied for enrollment and the number is growing.

"It is in direct line with the armament program which, by its strength alone, will prevent war. With so many young pilots available for instant call, we would never need fear attack and our voice in world affairs would be heeded even more than now. Through increased employment necessary for the manufacture, distribution and operation of these additional airplanes and airports, much of this money would be saved in reduced relief rolls.

"There are thousands of people who are willing to devote their energies to aviation either as a hobby or fulltime job. This plan enables these energies to be put to a good use in building up American aviation. The encouragement, financial aid and the definite program offered by this plan, will enlist the aid of thousands of people on a much larger scale than could be undertaken by the government alone.

"Now, where will this money go? Will it aid manufacturers? The answer is obvious. Individuals will pay the money in total, including varying amounts of their own, to instructors, who in turn will pay most of it to airplane manufacturers for new equipment. Part goes into the construction of new airports or maintenance of those already established, and part of it supports the instructors and their families. Practically all the money goes to labor through payrolls of the flying schools, airports, manufacturers of planes, parts, accessories and materials.

"I have been asked just how this project fits into the pump-priming class. The government spends a comparatively small amount of money which is enough to get many new people interested in flying. Once this interest is aroused they will spend money of their own in addition to that given them by the government.

"As an example, a young man stops at an airport which advertises flying lessons at $2.50 a week. He has always wanted to fly, but could not afford the important money usually associated with the game. But $2.50 a week is different. That is in his class and the range of his purse. He starts with a 20 minute lesson each week. In this particular case—which happens to be a true one—the lad's finances improved and within the next few months he spent $2,000 on aviation! He became intensely interested in aviation; sold his business and started a commercial flying service. He has since started a new airport and is the proprietor of a successful flying school, airplane sales agency and private flying center in Pennsylvania.

"In a like manner thousands of people who have never flown will take to aviation as a hobby or business, once they learn to like flying. There is little danger of overcrowding the field. There can never be too many airports. That is the main drawback to aviation today; not enough places to land. When America really starts flying every little town will support an airport as they do gas stations and garages today.

"It is a known fact that the Army and Navy are interested in civilian pilots.

"Many civilian pilots, myself included, have received letters from military agencies inviting them to register, asking if

reserve commissions would be accepted on fulfillment of certain requirements and if they would be willing to serve in time of war.

"This adds weight to my plan. It means your government can use you if you can fill the bill. And it seems only logical that the government should aid in preparing the youth of America to fill that bill.

"Naturally, there will need to be considerable lobbying and preliminary work. I am not a politician. I am primarily interested in seeing American aviation top the world. I think this plan can do it. I would like to see every patriotic citizen ask his representative and senator to pull for a bill to appropriate $10,000,000 to $20,000,000 to put this program into effect. Civic organizations, such as boys' clubs, veterans' groups, college fraternities, anti-war clubs and farm clubs, should adopt the plan as its own. I want no credit myself. The accomplishment will be reward enough.

"Summing the situation, the government will receive for its money (a) a strong aviation industry; (b) increased and improved manufacturing conditions; (c) plants and equipment; (d) trained personnel for manufacturing airplanes, materials and accessories, a prime necessity for hurried production of planes; (e) a flying public, providing in years to come thousands of natural aviators who grow up in an atmosphere of aviation, the best possible way to provide men for our flying forces; (f) complete coverage of the nation with landing fields and airports, important alike to civil and military flying."

Al has presented his case to leading figures in American aviation. In no case have they shown a lack of interest, and in most cases they have been, in varying degrees, encouraging to enthusiastic. C. B. Allen, acting director of liaison and information for the CAA, has expressed interest and will present the plan to the Authority at an early date. Colonel Rush B. Lincoln, chief of the Army Air Corps Plans Section, finds the plan of "sufficient merit to be given consideration by the CAA." Major General H. H. Arnold considers it "of sufficient merit to be given further study." Bernarr Macfadden, veteran pilot and publisher, likes the idea. "Your plan," he writes, "looks very good."

Emil H. (Eddie) Burgin, veteran pilot, the first man to fly around South America in a landplane, thinks well of the plan. "It is a fact," said Eddie, "that many people would take their aviation more seriously if they were not handicapped by lack of funds. It is an expensive proposition to learn to fly. I learned to fly in 1920. It cost me $3,000 to solo. If Bennett's plan of subsidizing civil aviation goes through, it will be a fine thing, not only for young Americans who want to sprout wings, but for the nation in general. Bennett may be a bit over-enthusiastic. Most idealists are. But he's got something to hang on to, something practical and worthwhile. I'm for it."

A CAA inspector, with no less than 10,000 hours in his log, likes the plan. "It's the first practical solution to the problem I've heard. There are holes in it, but they can be ironed out."

In the words of a prominent aviation authority, whose name must be withheld, "it's bound to come in this country. You've covered the ground very carefully. Its benefits are open to everybody."

So, Al Bennett, small town operator, whose "Learn to fly for $2.50 a week" plan has worked out for him, may be the means of developing America into a nation of flyers with the greatest defensive air force in the world!

END

Gas Model

(*Continued from page 66*)

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O'Donovan

(Continued from page 41)

Missouri, a pilot in a "Jenny" made a forced landing on the course. Obligingly, O'Donovan offered him aid.

"Want a ride to Pittsburgh?" invited the grateful pilot. O'Donovan did—and eventually did land in Pittsburgh and acquired a great interest in aviation.

Just about that time—1926—Clifford Ball, a Pittsburgh promoter, got the mail contract between Cleveland and Pittsburgh, via Youngstown, Ohio; strained his credit to raise $9,000 and bought three little Waco "9" biplanes.

O'Donovan promptly quit his job and accosted Ball:

"I need a job."

Ball gave him a job—then promptly forgot about him. O'Donovan helped the mechanics, ran errands for the pilots, helped to load and unload the airplanes—and soaked up information about anything and everything pertaining to airplanes and airlines.

Then came his big opportunity. A miserable day was that day of opportunity. Ceiling down to the ground, no visibility and raining cats and dogs. A good day to close the hangar doors and "ground fly" around the pot-bellied stove. But here was 800 pounds of air mail—worth $3 a pound to the airline—waiting on the field to go to Cleveland.

The pilots shook their heads, ominously.

"No use," they said. "Even the birds couldn't get through."

Remember, that was before the day of adequate weather reporting or blind flight instruments. The Wacos were lavishly outfitted with tachometer, altimeter, oil gauge and switch.

"We'll give it up," finally announced Ball disconsolately. "Can't send anyone out in this weather. Put the mail on the train; and there goes $2,400."

"Wait a minute," the new kid grasped Ball's arm eagerly. "I know how to get that mail through."

"Who's this fresh punk," demanded Ball of attendants, ignoring the lad, "who knows how to get the mail through better than the pilots? Who let him on the field?"

"He works here," a voice explained.

Ball finally lent an ear, and the new kid quickly explained his hunch. He had put in a few long distance calls, mapped the weather's path. "Now," he explained, "if the pilot takes off, flies 20 minutes south, he'll be out of it and have clear weather to Cleveland."

Eagerly, a pilot asked and got permission to try it—and took the $2,400 load to Cleveland safely.

That incident attracted Ball to O'Donovan.

"That kid," he predicted, "has got something. Watch him."

He sent O'Donovan to Youngstown to sop up experience—and he absorbed it rapidly, as Ball's tiny line prospered, earning him $25,000 to $30,000 a month.

In 1929, Ball bought a fleet of Fairchild 71's, extended the line to Washington and assigned O'Donovan as agent and good will ambassador at Washington, a ticklish spot. Here O'Donovan found his golf stood him in good stead. He spent more time on the golf course than he did in his office and jealous rivals often commented:

"O'Donovan's out playing again when he ought to be working."

But the Washington traffic soared miraculously, seats on the line's planes frequently were at a premium. O'Donovan made scores of fast friends on the Washington golf course.

Ball finally sold his interest in the airline which became Pennsylvania Air Lines, getting $800,000 worth of stock and a $12,000 a year job for his share. The line progressed rapidly, buying bigger and bigger ships and starting more schedules—Stinson tri-motors, Fords, Boeing 247's. But O'Donovan kept them filled.

Then O'Donovan was promoted to division traffic manager, then assistant to President C. Bedell Monro, then general traffic manager, and finally vice president in charge of traffic—and more and more business came rolling in.

One of dynamic young O'Donovan's favorite business-getting innovations is known as the "flying wedge," used in those cities where business is lagging or in cities where service is being started—and he frequently has these to work on for the line recently extended from Washington to Norfolk; from Washington via Baltimore, Harrisburg, and Williamsport to Buffalo; Pittsburgh to Buffalo; Detroit to Chicago; and Detroit to Saulte Ste. Marie, Michigan.

He merely assembles all his local traffic managers—10 to 15 energetic young fellows who are enthused with air transportation—in the city selected for "treatment," and then turns them loose on the local businessmen.

They call upon virtually everyone, talking transportation. If folks refuse to see them, they get in anyway, somehow, always talking air transportation. They talk before clubs and civic groups, fraternal organizations.

"And when we get through," said O'Donovan, "there is no one left in the city who doesn't know all about air transportation, its safety, its convenience, its time-saving. After all we don't have to sell air transportation. Air transportation sells itself. All we've got to do is to force people to learn about air transportation."

The "flying wedge," said O'Donovan, serves still another purpose—it peps up the personnel, too—and business seems to pick up all along the line after one of the "flying wedge" treatments.

"Bigger ships," says O'Donovan. "The DC-4's? Bring 'em along and we'll fill them up."

Perhaps the secret of O'Donovan's success is his enthusiasm. He fairly radiates enthusiasm about air transportation. No wonder his ships go out filled up.

END

Cradle of Aviation

(*Continued from page 52*)

swimming records; Lieuts. John A. Macready and Oakley Kelly, who broke several world's flight records; Lieut. Lowell H. Smith, leader of the Army round-the-world flight in 1924; the late Maj. J. P. Mitchell, former mayor of New York; Lieut.-Col. William Thaw and Maj. Kenneth Marr of the Lafayette Escadrille; Second-Lieut. James H. Doolittle, the speed ace, and many others.

Throughout the history of Rockwell Field, Maj. Gen. Henry H. Arnold, chief of the Air Corps, figures prominently. When a captain in 1917, he was Supply Officer at the Field, being transferred that year to Panama to organize the 7th Aero Squadron. From March 12, 1919, to May 28, 1919, as a temporary colonel, he was commanding officer, and again from 1922 to 1924, at his post-war rank of major, he was in charge of the base.

Rockwell Field's luster did not dim at the close of the World War. Performances that captured the imagination of the world continued to originate or end there.

On Nov. 14, 1918, 212 planes—the largest number ever to fly in one great mass formation in the nation's history—took to the air from Rockwell Field to celebrate the Armistice, with Lieut.-Col. H. B. S. Burwell in command.

First of the outstanding transcontinental speed dashes was that of Lieut. "Jimmy" Doolittle, who on the evening of Sept. 4, 1922, left Pablo Beach, Fla., stopping the following morning at Kelly Field, Tex., and arriving at Rockwell Field, 2,079 miles from his take-off point, in the flight time of 21 hours, 20 minutes.

The following month, Lieuts. Kelly and Macready in the giant monoplane T-2, which had a wing spread of 96 feet and a single Liberty engine, were forced back by fog near Imperial Valley on an attempt to set a transcontinental nonstop record. They returned to Rockwell Field, circled over it for 36 hr., 18 min., a world's endurance mark that was not authenticated, despite the fact that Army or Navy officers were witnesses to the entire flight.

Finally, after several more unsuccessful tries, the flyers negotiated the 2,250 miles from New York to Rockwell Field in the first non-stop east-west flight in 26 hr., 50 min. May 2-3, 1923.

In a specially designed DH-4 plane, America's first refuelling in mid-air was accomplished at Rockwell Field June 27, 1923, when Lieuts. L. H. Smith and J. P. Richter stayed aloft 6 hr., 39 min., after making two gasoline contacts. On Aug. 27-28, 1923, the pair created three new world's records for speed and endurance and broke five world's records for speed, duration and distance on a refuelling flight of 37 hr., 15 min. Average speed was 88.5 miles and distance covered was 3,293 miles.

Many another amazing feat cast its shadow over Rockwell Field. The first globe-girdling flight began and ended at Rockwell Field in 1924, with Lieut. Lowell H. Smith, who learned to fly at North Island, in command. And there was the first night refuelling in mid-air, with the plane *Question Mark* as recipient on Dec. 30, 1928.

But with the turn of the '30s, Rockwell Field began its slow retreat into the background of Army aviation. It was no longer an operating base, but merely a repair, supply and maintenance depot for Army planes of the 9th Corps Area, Hawaii and the Philippines. The romance of pioneering had given way to the prosaic efficiency of a smoothly functioning "airplane garage".

On Oct. 25, 1935, the doom of Rockwell Field was sealed by executive order, which transferred all of North Island to Navy jurisdiction. And today, only the ghosts of flying's most lustrous era fill the empty workshops, stalk the vacant hangars of an Army post that will never lose caste in the front ranks of aviation.

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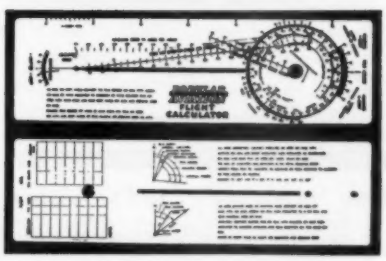

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Are You a Good Mixer?

(*Continued from page 48*)

from rich to lean): full rich, smooth operation, rich best power, lean best power (maximum efficiency), maximum economy and lean. We thus have a total of six independent mixture adjustments, each setting (except lean) intended for a special method of operation depending upon the various engine factors outlined about two paragraphs back. So far we have touched upon nothing "too technical" so let's proceed with a description of each of the above adjustments and outline the conditions under which it may be used.

Full Rich. As previously pointed out, this adjustment *will not* result in maximum power being delivered by the engine. Use this adjustment

(1) When taking off from any field whose surveyed elevation is less than about 3,500 feet above sea level. When taking off from higher fields the engine may have a tendency toward roughness when operated full rich; in this case the mixture may be leaned slightly to obtain smooth running, but it should be *as rich as possible* to obtain smooth engine operation when the throttle is set in the take-off position.

(2) Throughout short hops at low altitudes.

(3) When flying at full throttle or at other speeds considerably greater than normal cruising r.p.m. If the engine runs rough under these conditions it is permissible to lean the mixture sufficiently to restore smooth operation as outlined above.

(4) When flying any supercharged engine *below* its critical altitude. If engine runs rough due to too rich a mixture, adjust for "smooth operation" as described *below*.

(5) when descending from altitude. (There are numerous cases where engines have "conked" because the engine was starved due to too lean a mixture, particularly during the approach glide preparatory to landing. It's a healthy idea to develop the *habit* of moving the mixture up to RICH when descending from altitude.)

(6) When burning a gasoline having a lower octane rating than that recommended for use in your engine. The use of high octane fuels will do more to minimize troubles due to improper use of the mixture control than a whole book full of instructions.

Smooth Operation. One method of accomplishing this adjustment is as follows: First adjust for "rich best power" as described in the *following* paragraph, then enrich the mixture until the engine loses about 20 to 30 r.p.m., or until about half the increase in engine speed resulting from rich best power setting has been dropped. This adjustment is frequently employed when flying a supercharged engine below its critical altitude, but if the manufacturer of your engine recommends otherwise you had better let him be the doctor.

Rich Best Power. This setting of the mixture control, with a fixed given throttle setting, will result in maximum engine speed at the richest accompanying fuel flow. That is, further leaning of the mixture would result in no further increase in engine speed, while any richer adjustment would cause a decrease in r.p.m. To secure this adjustment, move the mixture control a little at a time, and very slowly, from full rich toward lean while watching the tachometer closely for any indication of increased speed. Since the chronometric type of tachometer behaves like first cousin to a jitterbug you will have to watch it closely in order to decide whether or not the engine r.p.m. is really increasing. The actual increase will range from 10 to 60 or more r.p.m., depending upon the engine and altitude. At any rate, when you discover that further leaning will not produce any more increase in engine speed it will be apparent that you have passed through the rich best power setting and some additional jockeying may be necessary (if you are fussy) to locate the exact point at which maximum r.p.m. is associated with the richest mixture producing that condition. This is the *maximum power* setting of the mixture control, and at this point the air-fuel ratio will be approximately 13 to 1. This adjustment may be employed when cruising an un-supercharged engine at speeds somewhat greater than normal, *but not a full throttle*. It may also be used when cruising supercharged engines above the critical altitude of the engine. After making this adjustment keep your eye on the eemperature and if there is any tendency toward overheating enrich the mixture promptly.

Lean Best Power. This setting is sometimes called the "maximum efficiency" adjustment. After setting to rich best power as described above, continue leaning—very slowly now—until the engine r.p.m. tends to fall off. The lean best power setting of the mixture control is that setting which, with a given fixed throttle setting, results in the *maximum* engine r.p.m., at the *leanest* accompanying fuel flow. That is, further leaning of the mixture would cause a decrease in engine speed. In making this adjustment you will undoubtedly observe that the engine speed will remain approximately constant for all settings of the mixture control between rich best power and lean best power position. This setting may be used *at or below* normal cruising speed with *un*-supercharged engines. You may also use this setting when operating a supercharged engine at *less* than normal cruising r.p.m. and manifold pressure, *but*—watch the temperature. Always remember that it is possible to ruin the power section of an engine completely by an improper use of the mixture control for only a few minutes.

Maximum Economy. This adjustment is obtained by first adjusting to lean best power and then leaning to obtain

a decrease of 20 to 50 r.p.m., depending upon the altitude and personality of your engine at the time of setting. Another favorite method of adjusting for maximum economy is to adjust to rich best power, then open the throttle to get an increase of 20 to 60 r.p.m. (depending upon engine and altitude); now lean the mixture again until the foregoing gain in r.p.m. has been lost. While the maximum economy setting of the altitude mixture control will keep you in the air (with a given quantity of gasoline) longer than any other setting, it is potentially the most dangerous adjustment you could use. Them may sound like strong words, but consider this: the rate of combustion of the fuel-air mixture introduced into the cylinder depends upon the proportion of air in the mixture and the grade of fuel employed. A lean mixture burns relatively slowly and consequently causes overheating since the mixture continues to burn *after* the piston has exposed a large area of the cylinder wall. Furthermore, since the *intake* valve is opened before the piston reaches top center of the exhaust stroke, the slow-burning lean mixture will backfire into the carburetor accompanied by Fourth of July sound effects. Prolonged overheating will tend to stick (and possibly break) the piston rings and burn pistons and valves. So—operation at maximum economy demands *caution* and *common sense.*

At night the nature of the mixture adjustment may readily be determined by noting the color of the exhaust flames. A long red flame indicates a rich mixture. A short purple flame signifies a lean best power mixture, or approximately so. A very short and irregular blue flame is an important tell-tale warning—you've guessed it—the mixture is too lean.

So much for the various mixture adjustments—now for a couple of practical precautions. First: remember that a given setting of the throttle and mixture control is theoretically good for *one altitude*—the altitude of original adjustment. Practically, if you readjust the mixture control for every 1,000 foot change in altitude you should be safe. Second: Don't try to spot fixed mechanical positions to which the mixture control should be set; the tachometer is the best indicator of proper adjustment of mixture control (unless you have a Cambridge analyzer). Even the analyzer may fail to indicate certain adverse conditions that the tachometer will show up.

Full rich—smooth operation—rich best power — lean best power — maximum economy—and "too lean"—here we have run the gamut of mixture adjustments and still no magic wand or rabbits hidden in coat-tails. No technical mumbo-jumbo and formulae to confuse and impress us—but in case any of you *should* have difficulty in deciding how rich or how lean you may adjust your altitude mixture control eake a lesson from our mutual friend, Pete—and for Pete's sake, *stay on the Rich side of Lean!*

END

Into Thin Air

(*Continued from page* 31)

commander and orders us on a given compass course and air speed. We get on it and climb. By this time the once-clear blue sky is obscured by an overcast high above us. We keep on climbing—8,000—10,000. I put on my wool-lined mittens and check over my instruments. Everything fine, I note. Still we climb.

Fifteen thousand. I call my gunner on the interphone and tell him to start taking oxygen. I turn my own oxygen on to the desired pressure and grasp the wooden tube in my teeth. It tastes cool and sweet. I remember the senior pilot back at the hangar. "Just breathe naturally," he had said. The tube drags heavily from the corner of my mouth. "It's heavy because I'm not used to it," I think.

UL2 calls and gives a new compass course. We turn onto it. Still we climb. Eighteen thousand. We have reached the overcast. I wonder if it is thin. It is. The flight commander finds a jagged hole and we start to go up through it. I jam my ship in close on my element leader's wing so as not to lose him in this soupy stuff. His blue fuselage and bright golden wings are now a fuzzy, dark profile against the gloom. I glance at my Prestone temperature and note it is dropping. I close my shutters a little and note that the temperature of the outside air reads five below zero. The engine in this damp air has a musty smell! "Like slowly burning insulation," I think to myself.

Twenty thousand feet. We break through the top of the overcast and emerge into the clear, cold air above. The formation loosens up now and I drop back and out a little. Again UL2 calls us and changes our course. This time they tell us the enemy's position and direction. The flight commander figures rapidly from the map on his knees in his cockpit. He finds the point where we should intercept them and changes our course again.

Twenty-two thousand. Still climbing, but much more slowly now. We are really getting into thin air. My controls respond sluggishly. My motor starts to run rough and I ease the throttle back a little. I notice that when I do this I slowly drop back. I glance at the other wing man. He is much closer up to the leader than I am. "Probably has a better ship," I think. My left wing tank runs dry and I switch to my right wing. I feel a bit drowsy and take the oxygen tube from my mouth and let it blow over my face. Its coolness is as refreshing as a drink of water.

Twenty-four thousand feet. My motor cuts out and then catches immediately. My heart skips a beat. I find that by nursing my throttle I can keep up fairly well. I turn my oxygen control to allow more to flow through.

Twenty-five thousand five hundred.

(*Continued on page* 84)

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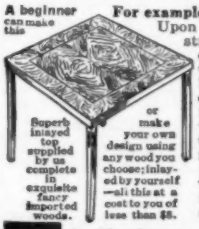

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Into Thin Air

(*Continued from page* 83)

The cold is starting to eat through my heavy wool-lined winter flying suit. I am glad for the sheepskin-lined slippers and wool-lined shoes I am wearing.

Twenty-seven thousand feet! Our cruising altitude. "So this is flying into thin air," I think. People down at the Beach Club are swimming and perspiring, and I am up here in 25° below! Vaguely I think of skis and snowy hills. The oxygen is now ice-cold. The roof of my mouth feels frozen and my lips are chapped. I worry a splinter on the wooden mouthpiece which by now feels like a lead weight clenched between my cold teeth. I think, "We should be making that interception pretty soon".

On and on we fly. I shiver involuntarily—my blood is still thin from being in Texas so recently.

"No. 3 to the flight commander. Something wrong with my gunner's oxygen supply. I am returning to Langley".

"Flight Commander back to three O.K."

No. 3 dives out of the formation. "The men from the boys", I think. "There goes one of the boys." I switch to my main tank as the right wing runs dry. My teeth feel like icicles.

I strain my eyes. Where are those bombers? And then I notice that something *is* wrong! I no longer have that cold stream blowing in my mouth. My oxygen has stopped flowing! The instrument shows no pressure—all used up. But this can't be. My crew chief said I had plenty for the flight. I turn the knob hurriedly once or twice. No soap. The flight commander had said to drop out and return to the field in case of trouble. I hesitate, then come to a quick decision. I figure the interception should be made within the next 10 minutes at most, and after attacking the bombers, we will go down and return. I'm in good physical shape—I'll fly without oxygen. Surely it won't bother me for that short a time. "The men from the boys", I think. "I'll show 'em. Five minutes pass. No bombers yet.

I fight off that dead-tired feeling—similar to the one you get when driving late at night—and you feel you simply can't keep your eyes open another minute. I reach down to close my shutters a little more and notice that it takes a great effort for my hand to obey my mind. I clasp and unclasp my fingers on the "stick," and that simple motion seems hard and forced. I have a slight headache. For a moment I think slowly—oh, very slowly—that maybe discretion is the better part of valor and I had better go downstairs. My mind won't seem to function properly. I look ahead at my element leader's ship. I fight that leaden drowsy feeling again—look back at his ship—only this can't be right—there are two ships there now!

I close my eyes and look away. Look back and open them again. There are whole flights of ships there. That drowsy feeling again. It feels so good. My hands drop from the stick and I slide forward in a gray fog of tiredness. Nothing matters. . . .

There is a great roar in my ears. I wonder why the engine is racing so much and I look at the airspeed indicator. 300 m.p.h.! I pull back on the stick so hard with both hands that it nearly blacks me out and the rate of climb indicator stops its frantic earthward descent. I look around for the formation and it is nowhere in sight. I am in dense clouds and go on instruments and fly blind. Not until then did I look at my altimeter. 15,000 feet! But this can't be—did I pass out or did the formation dive or what? I call my gunner on the interphone.

"Where is the formation"? I ask.

"You did a power-dive out of it, sir. No one followed. Did the Lieutenant get the number of the bomber he dove after? I didn't see it at all, sir".

I was stunned. I had been slumped over the stick for 12,000 feet and didn't spin! I had passed out cold as a cucumber, gone into a power-dive, and didn't know it until my gunner told me what happened! If he had only known my consciousness had gone into thin air, too!

"No", I reply slowly, "I didn't see it either." I decided not to tell him 'till we landed. I am still on instruments and letting down slowly through the overcast which, incidentally, had dropped lower during the morning. I remembered we had been flying a course of 160° when last in formation and I now fly this course. Coming out of the overcast into clear air I look around but cannot recognize anything. My head is one solid ache, and my ears are buckled up so bad the noise of the engine sounds distant and far away.

I reach in the side compartment for my map. It isn't there! I look again and search thoroughly. It sure isn't. But this is carrying a thing too far. I specifically recall placing it there before I took off. Was I going wacky? My head feels like I had it forced under water for long, long minutes on end. Well, no use crying over spilt milk. I head east knowing I will eventually hit the ocean, and can then fly either north or south to find Langley which is right on the water. I turn the radio beam on and receive no signal in my ears. Then I remember it is "out" for a few days while they overhaul its station. Damn the luck! I look at the gas gauge and get a funny feeling in the pit of my stomach. Around me are miles of swamps.

After a short time I come on a large inlet from the ocean. Having had a cross-country to New York's Mitchell Field one week previously I know I didn't fly over any similar terrain. Therefore I figure I am south of Langley some place. Still, I am not sure. Could this be the western shore of Chesapeake Bay? I am muddled.

I continue flying east, passing over a duck camp on a large swamp-surrounded lake (I learn later that the

large body of water is Albemarle Sound and the duck camp is Jack Dempsey's, on Mattamuskeet Lake). Though I didn't know it, I was in North Carolina. The gas is running dangerously low. I call my gunner on the interphone.

"Recognize any of this country?"

"No, sir", he replies.

I fly over a small island (later proved to be famous Roanoke island) and "buzz" a small fishing village, but can see no names in view on the buildings. And then—out of a thin haze—the blue ocean and sandy coastline ahead. Well, here I am. North or south? I curse myself for being so careless about a map. I decide to fly north on the one premise that I have never seen country like this *north* of Langley before. The slowly declining gas gauge reminds me somehow of an hour-glass counting out the minutes until I shall have a forced landing. The sandy beach looks better than any of this torn-up country to put it down, I think. Or how about the water?

I continue northward. Is that a hotel in the distance? It is—as I draw closer I recognize the familiar details of Virginia Beach and now I know that everything is all right. I am located, and head for Langley. But is it all right? Is my gasoline sufficient? I have been flying on reserve for some time now. I nurse it along slowly. A feeling of relief passes over me as I come across Hampton Roads at a good height and I know that if my gas gives out I can now glide to the field. It is not necessary. I lower my landing gear.

"UL2 from 5016. My wheels are down", I call in.

"5016 from UL2.O.K."

"Langley Control from 5016".

"5016 from Langley Control. Go ahead".

"Request landing instructions for one PB2".

"Land on runway No. 5. Wind southwest 20".

"Received O.K. 5016 off".

"Langley Control off".

I change propeller pitch, open my canopy, roll down my flaps, come in and land. I taxi up to the line and tell my crew chief what happened. He nods a few times, inspects my oxygen equipment and finds that the aperture through which the oxygen flows is too large and therefore I had used it up too fast, although the gauge registered it correctly.

I look around. There isn't a single ship on the line, and it yet lacks an hour until lunch.

"Where are all the planes, Sergeant", I ask.

"The entire group of 18 ships is out searching for you, Lieutenant". I winced.

My gunner climbs out of the back seat and I tell him what had happened—expecting him to blanch.

"That was tough luck, sir. We might have gotten us a bomber or two for lunch." He smiles. "Will the Lieutenant take me with him to Washington this Friday?"

Thinking of his confidence in me and all the trouble of the searchers, I all at once feel very small and insignificant. I go into the hangar, change my uniform and wait. One by one my fellow pilots return and wisecrack about it. I really take a riding. My crew chief comes in. My map is in his hand.

"On the floor under your seat, sir. Wind must have blown it".

I thank him. Never again will I try to combat the laws of nature and fly without oxygen into thin air.

My flight commander, the last to return from the search, walks in, with his 'chute hung from his shoulder. I tell him what happens.

He listens, smiles quizzically, and scratches an ear.

"Yes", he says. "Sometimes when the 'men' get lost we send the 'boys' out to find them."

END

Farewell, Tin Goose!

(*Continued from page 23*)

famously despite little things like that. Why, I remember one Tin Goose that had been flying all around the country with two one-dollar bills in one gas tank, unbeknownst to its crew. As a matter of fact, the ship had flown so well that they were all for leaving the money there.

I also recall the controversy some aeronautical "authorities" had had over the ability of a Tin Goose to climb over the Rockies in California. They'd never had a Ford out there and Maddux Airlines (part of the airline that now is TWA) wanted to buy some—provided the ship was capable of clearing the mountains safely. So Larry Fritz, a good friend who now is with TWA, answered that question by flying two Tin Geese from the factory, over the mountains, to Maddux.

American aviation owes Henry Ford, William B. Mayo (chief engineer of the Ford Motor Company), and William B. Stout (the Tin Goose's designer) a great deal. Mr. Ford footed the bill for each Tin Goose—they were turned out at a rate of four a week—although he lost money on every one. And, while the tri-motored Ford was flying the airlines in its heyday, Mr. Ford also developed a group of men—both pilots and operations men—who today still play an important role in the commercial aviation scene. They all got invaluable training on the clattering Tin Goose. Offhand, I think of Hi Little, "Shorty" Schroeder, Larry Fritz, Pat Gallup, Eddie Hamilton, Earl Fleet, Foster Tompkins, Perry Hutton, Steve Welsh—the list could go on and on. . .

But out of sight is not out of mind. Every time I—or any of the other old-timers who knew the Tin Goose well—see one of he lumbering Fords, the whole picture of aviation 13 years ago comes back. She was and is a thoroughbred, but her days are almost up. I suppose it's time we wipe our eyes and say goodbye. . .

Farewell, my lovely Tin Goose!

END

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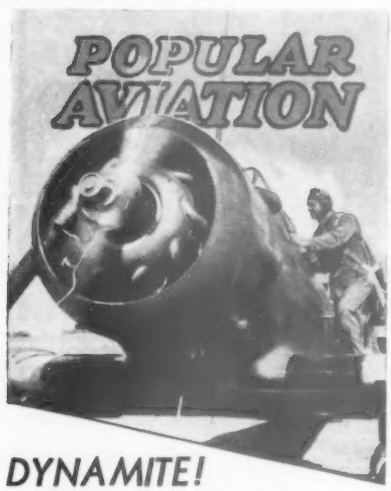

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MARCH ISSUE ON SALE FEB. 10TH

In Case of War . . .

(*Continued from page 34*)

Let us assume that this great spur-of-the-moment force has been landed in New England. What next? Most of the commercial liners would remain in courier and transport duty. But some would metamorphose into grimmer machines of war. The long-nosed, deep-bellied Lockhead "14", for example, the still-powerful Boeing 247's, the Douglas DC-4 (if it's in service), and the Boeing "stratoliner," are convertible bombers. Not the best in this no-longer peaceful world, perhaps, but eminently adequate. Great Britain has ordered a 200-unit batch of the Lockheeds, and the Boeing is an adaptation of the famed *Flying Fortress*. This isn't news to aviation wiseacres. But it is comforting, nevertheless.

America's serviceable 2,700 warplanes, most of them light craft capable of attack, reconnoitering or pursuit, would need plenty of bolstering—even by converted transports.

As the days and months spin past, civil aviation is adding to its store of wonders for the future, wonders that will increase America's guarantee of safety. Blind landings (which the Army has helped pioneer), static-proof radio, bigger engines, and all the rest would add immeasureably to defense of the nation against an invasion.

How? Because once an emeny landed on America's shores, it would be alone in a strange land, without any of these aids. Retreating, the apparatus that permits blind-landing, for example, could be destroyed by U. S. forces. European aircraft radios generally don't operate on American frequencies, hence the airways systems would be useless to them. In bad weather, an enemy would be stranded like ducks in the mud, while the home defenses could be strafing the daylights out of it.

That's civil aeronautics' contribution to saving America.

But there are other gifts. Those 16,500 non-commercial airmen could step into fighting ships with a little extra instruction. Remember that about 6,200 of them hold commercial ratings from the Civil Aeronautics Authority, about 1,000 sport limited commercial certificates, and the rest fly as privates or amateurs. Many are women. Yet Laura Ingalls, America's No. 1 woman stunt pilot and a contender for distance honors, told me recently that her sex would be tickled pink to carry on in the more humdrum aerial occupations while the menfolk were off fighting.

Remember this: with almost 18,000 men and women flying as registered, licensed pilots (exclusive of the Air Corps contingent), another 30,000-odd are earnestly spending their week-ends taking lessons. Then there are many glider pilots whose experiences with the thermals make them likely material for quick instruction and elevation to heavier-than-air ships.

Meanwhile, with their foreign orders bulking big on their order books, America's $150,000,000 aircraft industry stands in a favorable position to produce a complete Air Corps within a few months. It can't be done overnight. Yet a national emergency probably wouldn't arrive between sundown and sunrise, either.

Somebody must fly this aerial armada. Under present Army appropriations, not an extra man is available to the Air Corps.

Only last month, a military flying officer told me that the Army builds up a splendid—though insufficient—group of second lieutenants, only to have them go on the reserve list when their training period ends. He said the Douglas B-18's, for example, are flying with reduced crews, and mechanics are doing commissioned officers' duties for lack of adequate men. The B-18's normally demand seven men to fly, observe, bomb and machine-gun. Today they operate with six. Thus, too, with the Boeing B-17's.

Nobody anticipates an enemy striking at America. Strictly speaking, we have no enemies embittered enough to launch a war against us that would stand at the outset as a 1-10 bet against themselves. Yet as the next few years pass, the trend of world affairs may change. Certainly it is that the world bountaries and outposts, now seemingly loosely surrounding the United States, will shrink. The two oceans won't be impregnable barriers forever.

So commercial aeronautics will always be the second line of aerial defense. Always—and always growing stronger.

END

It's the Hell . . .

(*Continued from page 39*)

moved by careful planning, strict supervision, and good facilities. Carrier rendezvous. Fixed gunnery, using machine guns firing through the propeller. Dog fighting. . .

How long is your nerve recovery period now? Where are your nerves, for that matter? You've left them somewhere along the way and you really don't need them much anymore. Flying safely consists of gradually replacing one quality with another—both you must have at the outset. These qualities are nerve and judgment. At first nerve carries you through. But judgment slowly creeps in to replace nerve. In operation after operation, nerve slips into the background. Judgment, sound knowledge of what a particular plane will do in each particular situation, supplants nerve. It's best, too, for a man can't go forever on nerve but he can on judgment.

If you have nerve and judgment and can use each in its place, this is *the* "if" that determines whether or not you will be a Naval Aviator.

END

You Can't Get Away With It

(*Continued from page 27*)

This is mathematical and aerodynamic law, and you can't get away with anything unless you respect and understand it. Reject it, or try to compromise with it—as the pilots I've mentioned above were doing—and you invite disaster. The first stunt pilot mentioned tried to get away with a spin too close to the ground, coming out of it too low, and then pulling out of his dive too sharply. Not figuring the added "Gs" (or increased wing loading) he expected the airplane to respond too quickly and beyond limits for which it was designed. This was a monoplane with a rather high initial wing loading and a small wing area, which resulted in the wing loading increasing rapidly. The second pilot was flying a biplane with a fairly light wing loading. Had he been in a monoplane I think he would have lost much more than his healthy coloring.

In the case of the Oregon student, he didn't realize that while in an abrupt gliding turn, as in approaching a field and reversing direction quickly to come into the wind for a landing a 2½ "G" load was probably thrown upon the wings. This meant that the wing loading of his ship was increased about 150 per cent and that if his normal stalling speed was 50 m.p.h. it probably was increased to about 67½ m.p.h. while in the turn. The wing tips probably stalled at greater speed than that, for wing tips, as I have pointed out, usually stall first. I will explain the wing tip stall later.

As far as spinning or rolling off the top of a loop is concerned, I've never flown an airplane which had any inherent characteristics of this type. They looped perfectly after I discovered that centrifugal force was such an important factor.

I have found in each case where a pilot has not been able to loop his ship that he has failed to consider G-loading as centrifugal force. He has not considered the resultant high stalling speed developed by pulling the stick *back* at the top of the loop. Although his intention is to pull the stick back and point the nose down so that the ship will gather speed, actually he is increasing the stalling speed of the airplane by increasing its change of direction rapidly at high speed. Correct procedure is for the pilot to ease off on the stick as he approaches the top of the loop, which will lessen the curve of the circle of flight, counteracting the stall by decreasing the G-loading. Actually, if the pilot pushed the stick just slightly ahead as he approached the top of the loop he would describe a more perfect circle and maintain better control at all times.

If you want the actual mechanics of an upside down stall—with plane inverted and the ship stalling *away* from the ground—this is what happens:

Let us say that you start the loop with a dive at 150 m.p.h. At the base of the dive and the start of the circle you are pulling perhaps three "Gs." The wing loading is up 200 per cent. The stalling speed is up about 50 per cent. In other words, you're ready to stall at 75 m.p.h. if your ship normally stalls at 50. Suppose you hold the three "G" load around the first half of the loop. At the top, perhaps the speed has dropped to 75 m.p.h. and the ship is ready to stall. One wing tip usually stalls before the other, due to the action of engine torque. The wing tip, remember, drops *up*. This causes the air plane to do a half snap roll, or perfect Immelmann. This condition is also aggravated by the twisting action of the slipstream. The half snap roll is also usually helped by the pilot who, bewildered by the—to him—strange goings-on, jerks back on his stick, increasing the centrifugal load even more and ending in a spin.

Fortunately for those who don't understand this "spinning out of a loop," the Civil Aeronautics Authority has posted the minimum height for aerobatics at 1,500 feet. This is the height at which maneuvers must be completed, not at which they can start. A good altitude is at least 2,500 feet to begin. Many pilots were killed before this regulation was made and enforced by looping too close to the ground and spinning out of it either at the top or at the bottom. If altitude is preserved any aerobatic student who can recover easily from a spin can practice such maneuvers as the loop with comparative safety. Centrifugal force increases as the square of the speed and also increases rapidly when the radius of the turn is decreased.

Once the principle of centrifugal force has been stamped on a pilot's brain much of his grief is over. And, if the principle were generally understood there would be fewer black marks against aviation.

Too few pilots realize that airplanes are designed to operate within certain limits and when one goes beyond these limits trouble is being courted in no uncertain manner. A pilot who fails to understand principles of flight is in exactly the same position as a man who believes that it is perfectly safe to drive an automobile 70 m.p.h. along a slick wet pavement or ride an elephant on the handlebars of a bicycle.

The trouble is that in the case of the man and the car or the man and the elephant, logical human beings say:

"He should have known better."

But the public doesn't know enough about aviation yet. When the pilot breaks a rule, crashes, wrecks his ship and perhaps kills himself, Mr. Average Man doesn't understand that the pilot has over-stepped. He simply lays aside his newspaper with a sigh and says:

"That goes to show you! Another unexplained crash. Aviation isn't safe."

END

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Airy Chat

(*Continued from page 8*)

True, the use of phenol resins were not employed as the mastic or "aggregate" at that time because these resins were then only laboratory curiosities, but the underlying basic principles were demonstrated in their entirety—then the matter was dropped in favor of the more conventional trussed structures that have persisted for so many years.

Even today, we are not so sure that the phenol resins show any great advantage over the original papier-maché (paper pulp) of Bleriot for the reason that the lighter and more bulky paper pulp shows certain advantages when employed as a compression member because of its greater thickness and, consequently, greater comparative radius of gyration.

* * *

WHILE one author-contributor to this magazine, notably the "Man-Under-The-Hood", laments the safe-guarding of our national military aviation secrets by the various airplane constructors, we must disagree with him.

Secrecy as to recent developments in military aircraft design and constructional details is our only protection against the hordes of spies now in this country. The most valuable invention or development will become worthless over night if the public, at large, is permitted to walk at random through the manufacturing plants or to obtain records of the performance from official sources.

We have a sufficient number of enemies at the present time to warrant taking all possible precautions against possible spies or foreign agents. Our only protection against an aerial defeat is to make secret all engineering details of planes and engines. Such secrecy is accepted as a matter of fact when applied to armament and the same spirit of cooperation should be displayed when the subject is military aviation.

* * *

THERE seems to be a series of articles prevalent in certain popular magazines concerning the safety problem as regards our airlines. One article in particular presents the crash problem in a distinctly unsavory light—unsavory, that is, to the airlines concerned. The author is Kenneth Brown Collings and, writing in the *American Mercury*, he covers safety in air travel in a somewhat critical light. Mr. Collings' "pet peeve," incidentally, is parachutes-for-airliners and he has dwelt on that subject in his writings more than once. Incidentally, he does present some potent comments in that connection.

Among various statistics thought up by Mr. Collings, there is a table showing the odds in favor of the probability of being killed on an airline, broken down to the 12 months of the year. We are inclined to wonder about his chart, however, as he lists the month of September as by far the safest month of the year to fly.

END

Coast-to-Coast

(*Continued from page 68*)

minutes later, two fellows shoved through the crowd with a large chunk of airplane fabric they wanted me to autograph. I asked them where they'd gotten it and they pointed to the bottom of my ship!

After a couple of glasses of orange juice (Florida!), we piled into a car and drove into New York. And, just as we drove away from the field, the ceiling really dropped right down on the ground, complete to a pouring rain! It seemed as though Mother Nature had just been waiting for me to land before cutting loose.

From then on it was a series of interviews, radio spots and dinners. The latter included a policeman's ball, where I was made an honorary cop. Officials of American Airlines as well as other civic groups had all sorts of things planned, but, at midnight, I decided I'd better get to bed. Truthfully, I still wasn't tired, but I thought it better not to sit around and wait for the letdown.

When I finally got to bed, I had been up constantly for 41 hours—from 4 a.m. November 29 to midnight of November 30. Naturally I felt wonderful over the whole thing. Above all, I had proven beyond any doubt that our modern lightplanes really could take it . . .

My fastest cruising speed over any leg of the flight was 98.3 m.p.h. Cruising speed for the entire flight was 90.6 m.p.h. Average altitude for the flight was 5,000 feet above sea level. And, when I landed at Roosevelt Field, I still had enough gas left for six more hours of flying!

END

Man Under the Hood

(*Continued from page 49*)

unlawful . . . the CAA has ruled that this is a "discriminatory practice" . . . now, scrip can only be used by the card holder or an employe of the company to whom the cards are issued . . .

* * *

The **Junior Birdmen of America** organization still is trying to get a backer and another foothold like they had when the Hearst papers were behind them . . . to date, though, they're still trying —unsuccessfully . . . meanwhile, **Winthrop Rockefeller**—who's got as much money as you think he has—has started up his own youth organization . . .

* * *

Odds and Ends: **Dick Merrill** may buy a high-speed **Seversky** with 4,000 miles range for a possible transatlantic hop to Paris soon . . . by the time you read this, **Jacqueline Cochran** may have made a stab at **Howard Hughes'** transcontinental record . . . **Eugene Vidal**, erstwhile Air Commerce director, is said to have patented a plastic for aircraft and that **Du Pont** is looking on with interest . . .

END

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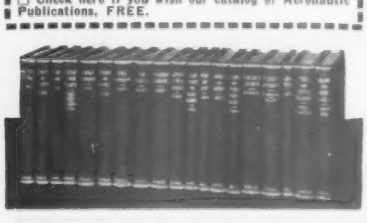

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